STATISTICAL ANALYSIS OF RESIDENTIAL HOUSING PRICES IN AN UP AND DOWN REAL ESTATE MARKET: A GENERAL FRAMEWORK AND STUDY OF COBB COUNTY, GA

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STATISTICAL ANALYSIS OF RESIDENTIAL HOUSING PRICES IN AN UP AND DOWN REAL ESTATE MARKET: A GENERAL FRAMEWORK AND STUDY OF COBB COUNTY, GA

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This research is dedicated to my beautiful wife and daughter who have exhibited tremendous patience and encouragement as I have spent countless hours away from them working on this degree and thesis.

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LIST OF SYMBOLS AND ABBREVIATIONS

FMLS:	First Multiple Listing Service
CPI:	Consumer Price Index
GDP:	Gross Domestic Product
DJIA:	Dow Jones Industrial Average
Price/SF:	Price per Square Foot
RSS:	Regression Sum of Squares
SSE:	Residual Sum of Squares

SUMMARY

The recent economic recession has had a significant impact on residential real estate both nationally and regionally. Our research is focused specifically on Cobb County, Georgia and the impact that the declining economy has had on home buying and property values in this area. Specifically, this research aims to identify changes in the residential market in terms of significant characteristics of housing and their corresponding effect on home values.

Every home buyer places a certain amount of significance on the many different aspects of a particular property that give that property its inherent value. For instance, some houses are worth more because of their proximity to a desirable area, the number of bedrooms or bathrooms, the square footage of the home, or even just the existence of a basement. One of the questions this research will seek to answer is how home buyers change in their preference for certain housing characteristics in a good economy versus a bad economy.

There is little debate that property values have declined during the course of the most recent recession. Our research will also attempt to understand if there are certain identifiable characteristics of housing that tend to make the greatest impact in terms of which houses depreciate in a declining market and which houses do not.

CHAPTER 1

INTRODUCTION

From approximately 2008 through the present day (2009), the U.S. has been in a fairly severe recession that has taken a toll on many aspects of American Life. From fallings stocks to rising unemployment, most all American families have experienced some ill effects from the economic downturn over the last couple of years. In addition to the many different economic metrics that indicate a slowdown in the economy, this particular recession has been characterized by falling real estate values as well. In fact, the National Association of Realtors reports that home values nationwide have slipped from an average price of $221,900 in 2006 to $177,700 in August 2009 (NAR, 2009). With home values slipping almost 20% nationwide in only 3 years, many families are left wondering what has happened to the value of their own home and what attributes of their property make it more or less desirable to rest of the market.

While economic recessions are particularly painful to those who find themselves without work or a mortgage they cannot pay for, they do afford us an opportunity to research changes in behavior in the midst of an unhealthy economy or real estate market. For example, in a good economy when house prices are consistently rising, most consumers are

comfortable paying what is perceived to be full market value for a given property because the inherent assumption is that values will continue to rise. In fact, in the early to mid-2000's many consumers took advantage of unconventional mortgage products because the underlying assumption was that real estate prices will continue to rise indefinitely. As we know now, our national real estate market was indeed more susceptible to decline than anybody would have guessed. However, now that we find ourselves in a declining real estate market, there is an opportunity to understand what inherent characteristics of real estate continue to elevate certain properties to the top of the real estate market and what characteristics serve to depreciate others.

Our research seeks to understand how homebuyers and their affinity for certain characteristics of housing have changed over the course of this dramatic drop in the real estate market. What characteristics of housing contribute to the overall value of a residential property in a good economy and is this the same or different in a bad economy? Additionally, why do some houses maintain a fairly consistent value in an economic downturn and why do others experience a decrease?

To measure these differences, we selected Cobb County, Georgia as our test region and chose two months in time to represent the good

economy versus the bad economy. We identified approximately 190 properties sold in August 2006 and compared them with 165 properties sold in August 2009 in an effort to identify any noticeable changes. Our data collection involved identifying and measuring 20 different characteristics of each property including square footage, number of bedrooms and bathrooms, interior and exterior conditions, school quality, proximity to downtown, etc.

To analyze the differences between the data set for 2006 and the data set for 2009, we used various statistical analysis tools. Through the use of correlation identification, the Best Subsets Regression model and the Stepwise Regression model, we were able to determine which characteristics of housing were significant in determining home values in 2006 as well as 2009. Through this analysis we were also able to make certain observations in regards to which characteristics of residential properties helped to maintain or depreciate housing values during an economic downturn.

CHAPTER 2

LITERATURE REVIEW

2.1 Hedonic Regression Analysis and Pricing Models

In our attempt to understand changes the real estate market, we must be able to break down how residential properties are analyzed by homebuyers. While homes and homebuyers are heterogeneous, there are certain definable characteristics and attributes to residential properties that contribute to the overall appeal and market value that a given property elicits. Essentially, any type of good or commodity can be viewed as a package with many different characteristics that add or subtract to the overall value of that particular good. This is true for real estate as well. A residential property is simply a combination of characteristics (such as size, location, construction, etc.) that all contribute in some measurable way to the ultimate value that a particular buyer places on that home.

This concept of identifying individual traits for a particular good actually goes back to the early 20th century with the study by Court (1939) where he first created a system for modeling a price index for automobiles. This concept of product differentiation based on hedonic

modeling was later expanded by Lancaster (1966) and Rosen (1974). Lancaster is often credited with the development of a branch of microeconomic theory based on the idea that goods are valued by the inherent characteristics that comprise a particular good. He applied this theory to housing as well as topics such as financial assets and the demand for money.

Rosen's work is similar to Lancaster's, but his focus is more on the interaction between suppliers and consumers. His original work with this model is the basis for much of the research that has been done in relation to estimating demand functions for real estate and the measurement of individual housing characteristics. At the most basic level, Rosen surmised that "goods are valued for their utility-bearing attributes or characteristics. Hedonic prices are defined as the implicit prices of attributes and are revealed to economic agents from observed prices of differentiated products and the specific amounts of characteristics associated with them" *(Rosen, 1974).*

This approach was later applied to estimate property values based on structural variables, location variables, neighborhood variables, and other external factors. In his research paper, "The Measurement of Neighborhood Dynamics in Urban House Prices" (1990) Ayse Can applied Rosen's principles of Hedonic price regression to urban house prices

based on characteristics such as: type of housing, number of bedrooms, living space, fireplace, basement, garage, distance to central business district, distance to shopping centers, distance to transportation networks, quality of schools, public services, safety, environmental pollution, environment noises, etc.

Can argued that based purely on the hedonic price function, "housing is a multidimensional good differentiated into a bundle of attributes that vary in both quantity and quality. Accordingly, the hedonic housing price regression becomes an operational tool that functionally links housing expenditures to some measures of attributes of houses" *(Can, 1990)*. His paper went on to advance this theory to include the effects and measurement that the neighborhood has on the hedonic housing price regression model. Can determined that there were nine different variables that effect neighborhood quality that include: percentage of nonwhite population, median household income, percentage of unemployed persons, percentage of families under the poverty level, ratio of owner-occupied units to renter-occupied units, percentage of unites built before 1939, percentage of vacant units, percentage of housing units with complete plumbing, per capita crime to property. Based on these factors, Can developed a standardized neighborhood quality score that was then used in his price regression model.

Other notable contributors to the study of Hedonic analysis in terms of demand for housing and neighborhood characteristics include Palmquist (1985), Follain and Jimenez (1985), Blomquist and Worley (1981), Witte, Sumka and Ererkson (1979), Harrison and Rubinfeld (1978) and Nelson (1978).

In 1985, Validimir Bajic wrote the paper "Housing-Market Segmentation and Demand for Housing Attributes: Some Empircal Findings" (1985). His paper expanded on the theory of hedonic regressions and the contribution of various housing characteristics to housing prices. In his paper, Bajic used Rosen's Hedonic approach to housing prices, but also noted that "a simple market-wide hedonic regression assumes a unified housing market near or in short-run equilibrium" *(Bajic, 1985)*. He went on to argue that there is a difference in attribute prices across different market segments and that these should be considered in the housing pricing model. Ultimately, he concluded that the hedonic model should be fitted separately for different submarkets.

This concept of increasing the accuracy of the hedonic analysis by narrowing the subject group into particular submarkets has been given more attention in recent years including a study by Goodman and Thibodeau (2003) and Sirmans, Macpherson and Zietz (2005). In their

paper, "Housing Market Segmentation and Hedonic Prediction Accuracy," Goodman and Thibodeau developed parameters for creating a hierarchy of submarkets. It should be pointed out that in their study they underscore the importance of school quality in delineating submarkets. This is something that in our analysis also seems to play a vital role in the hedonic modeling results.

Sirmans, Macpherson and Zietz (2005) state that; "One caveat in using hedonic pricing models is that the results are location-specific and are difficult to generalize across different geographic regions"(Sirmans, Macpherson and Zietz, 2005). While performing studies across broad geographic regions may help identify consistencies across a broader market, we felt that there was enough research that pointed to the need to focus our study on a more concentrated geographic region (i.e. Cobb County, Georgia).

The study by Sirman, Macpherson and Zietz was also very interesting because they analyzed 125 different Hedonic Pricing Models that have been published over the previous decade. This study identified the most common housing characteristics that were used in hedonic pricing equations as well as whether or not those particular factors had positive or negative effects on the overall pricing for that study. Below is a copy of

the chart indicating the characteristics most often found in hedonic modeling studies (See Table 2.1).

Table 2.1

The 20 Characteristics Appearing Most Often in Hedonic Pricing Model Studies				
Variable	Appearances	# Times Positive	# Times Negative	# Times Not Significant
Lot Size	52	45	0	7
Ln Lot Size	12	9	0	3
Square Feet	69	62	4	3
Ln Square Feet	12	12	0	0
Brick	13	9	0	4
Age	78	7	63	8
# of Stories	13	4	7	2
# of Bathrooms	40	34	1	5
# of Rooms	14	10	1	3
Bedrooms	40	21	9	10
Full Baths	37	31	1	5
Fire place	57	43	3	11
Air-conditioning	37	34	1	2
Basement	21	15	1	5
Garage Spaces	61	48	0	13
Deck	12	10	0	2
Pool	31	27	0	4
Distance	15	5	5	5
Time on Market	18	1	8	9
Time Trend	13	2	3	8
** reproduced from Sirman, Macpherson and Zietz (2005)*				

In Stephen Malpezzi's review of Hedonic Models (2002), he identifies the characteristics, based on his vast studies and experience, that he would consider part of a full dataset when developing a hedonic regression model (Table 2.2).

Table 2.2

Malpezzi's List of Housing Characteristics	
1	Rooms, in the aggregate, and by type (bedrooms, bathrooms, etc.)
2	Floor area of the unit
3	Structure type (single family, attached or detached, if multifamily the number of unites in the structure, number of floors)
4	Type of heating and cooling systems
5	Age of the unit
6	Other structural features, such as the presence of basements, fireplaces, garages, etc.
7	Major categories of structural materials, and quality of finish
8	Neighborhood variables, perhaps an overall neighborhood rating, quality of schools, socioeconomic characteristics of the neighborhood
9	Distance to the central business district, and perhaps to sub-centers of employment; access to shopping, schools and other important amenities
10	Among characteristics of the tenant that affect prices: length of tenure (especially for renters), whether utilities are included in rent; and possibly racial or ethnic characteristics (if these are hypothesized to affect the price per unit of housing serviced faced by the occupant)
11	Date of data collection (especially if the data are collected over a period of months or years)

(Taken from "Hedonic Pricing Models: A Selective and Applied Review" Stephen Malpezzi. Prepared for Housing Economics: Essays in Honor of Duncan Maclennan. April 10, 2002)

Based on these studies, we have compiled a list of characteristics in our data set that takes almost all of these housing characteristics into account. It should be noted that a few of the characteristics we do not employ in our dataset have to do with the fact that we are measuring the affect of housing characteristics on sales price rather than rental amounts.

2.2 Economic Factors and Their Affect on Real Estate Values

While it may seem obvious that the downturn in the economy between 2006 and 2009 has had an impact on real estate values, it is important to understand the true accuracy of this assumption. In justifying the notion that real estate values have dropped as a result of the economy, we look at certain economic indicators and measurements to confirm that real estate prices have indeed dropped in conjunction with declining economic metrics. There have been a number of researches who have attempted to determine which economic variables have the greatest impact on home prices. While it is not necessarily our goal to identify exactly which indicators have what impact, it is important to confirm that there is a correlation between negative economic news and a reduction in home values.

Alan Reichert did a study in 1990 which examined both national and regional economic factors and their corresponding effect on regional housing prices. In his research he concluded that certain factors such as interest rates have a fairly uniform effect nationally, while regional factors such as population, employment and income have a measurable effect as well. He goes on to argue that national policy towards housing should look at the United States in terms of 4 broad regions with differing economic factors rather than the country as a whole. Another interesting

finding in this research was a fairly consistent seasonal effect in which housing prices tend to experience slight increases and decreases during different quarters throughout the year. As a result of this research, we have collected economic data both on a national level as well as a regional level in our attempt to understand the true economic effect in our area of study. In addition, our two sets of data were taken from the same month in an effort to eliminate any seasonal variation in values.

Other similar studies were performed by John Quigley in 1997 as well as in 1999. In his study, he concluded that real estate values are indeed affected by fundamental factors in the economy. Some of the factors he mentioned in his study include the Consumer Price Index, population, vacancy rates, unemployment rates, mortgage volume and housing sales. Similar to Reichert's work, Quigley also concluded that regional economic factors are an important measurement when analyzing a particular housing market.

Still another study by John Clapp looked at the effect of economic variables on local housing prices. While his research focused more on two particular models for measuring housing price indices, he also concluded that housing prices as a whole do respond negatively to an increase in interest rates as well as high unemployment figures.

While these conclusions about the effect of the national and local economy on real estate values may seem obvious, it is important to confirm this natural assumption before evaluating our data. As a result of this literature, we will attempt to gather economic data at a national level as well as a regional level. We will also attempt to eliminate seasonal fluctuations by collecting data from same month in time across different years.

CHAPTER 3

METHODOLOGY

3.1 Sample Area

Our interest in analyzing changes in home buying activity in a bad economy versus a good economy required that we eliminate as much variation as possible outside of the economic effects on the real estate market. In an effort to eliminate "outside noise" in our dataset, we employed the following criteria in our data collection.

First, we narrowed our dataset down to a particular geographic region; Cobb County, Ga. We originally considered a broader set of data that would encompass all of Metro Atlanta, but determined there were too many pockets of real estate within all of Metro Atlanta that may throw off the results of the regression modeling. For example, were we to take sample data from areas closer to the city of Atlanta, we know that there would potentially be large variations in home value based on crime, proximity to trendy shopping and restaurants, new developments, etc. It is not uncommon to have 200% swings in home values within 1 or 2 miles in certain parts of Atlanta. While there are already a number of studies that

have attempted to explain urban neighborhood dynamics, we wanted to focus our study more on the suburban setting.

Figure 3.1

Cobb County is located just to the northwest of Atlanta and is the fourth most populated county in the state, behind Fulton County, Dekalb County, and Gwinnett County. Within the 10 core counties that make up Metro Atlanta, Cobb County accounts for approximately 16% of Metro

Atlanta's population (See table 3.1). There are 5 cities within Cobb County which include Acworth, Austell, Kennesaw, Marietta, Powder Springs, and Smyrna. While there is a fair amount of variation throughout the county in terms of crime, schools, income, etc., we did not feel like there was so much variation that our results would be skewed. In fact, the variances in proximities, schools and demographic makeup actually make it a great geographical area to analyze as we seek to identify which of these types of housing variations have the biggest impact on value.

Table 3.1

Metro Atlanta 10-County Core		
County	**Population**	**% of Core Counties**
Cherokee	203,000	4.95%
Clayton	281,400	6.86%
Cobb	674,200	16.45%
Dekalb	727,600	17.75%
Douglass	127,800	3.12%
Fayette	106,000	2.59%
Fulton	951,500	23.21%
Gwinnett	752,800	18.36%
Henry	190,700	4.65%
Rockdale	84,600	2.06%
Information provide by Atlanta Regional Commission		

Our second consideration in collecting data was to select properties that had sold in a good economy versus a down economy. We selected August 2006 as the month for sales in a good economy and

August 2009 as the month for sales in a down economy. We go into more detail in the next section that describes how we measure the health of the economy and how we can determine a good economy versus a bad economy. However, the reason we selected only one month in time for each year was to eliminate as much variation as possible in regards to changing interest rates, seasonal variations in the market, and other economic changes. The idea was to take a snapshot of the real estate market for each point in time without introducing too many other influences. The data that we collected includes only properties that have a selling date between August 1st and August 31st for the respective years as recorded in FMLS (First Multiple Listing Service).

The third consideration in collecting our data was to only include retail sales up to $600,000 dollars. This meant that we did not include foreclosures in our data. While some may argue that foreclosures are a significant portion of the real estate market, especially in 2009, we did not want to include distressed sales. This meant that the properties that we selected from the First Multiple Listing Service could not be classified as "Foreclosure", "Short Sale", "Corporate Owner" or "Lender Owned." We believe that the distressed sales did not accurately represent the average consumer's purchasing decisions and as such, would potentially skew the results of our analysis. Additionally, we did not include homes over

$600,000 as this represented only a very small segment of the housing market in Cobb County. The few number of homes that could have been included in our research in this price range would have been outliers and would have potentially skewed our results.

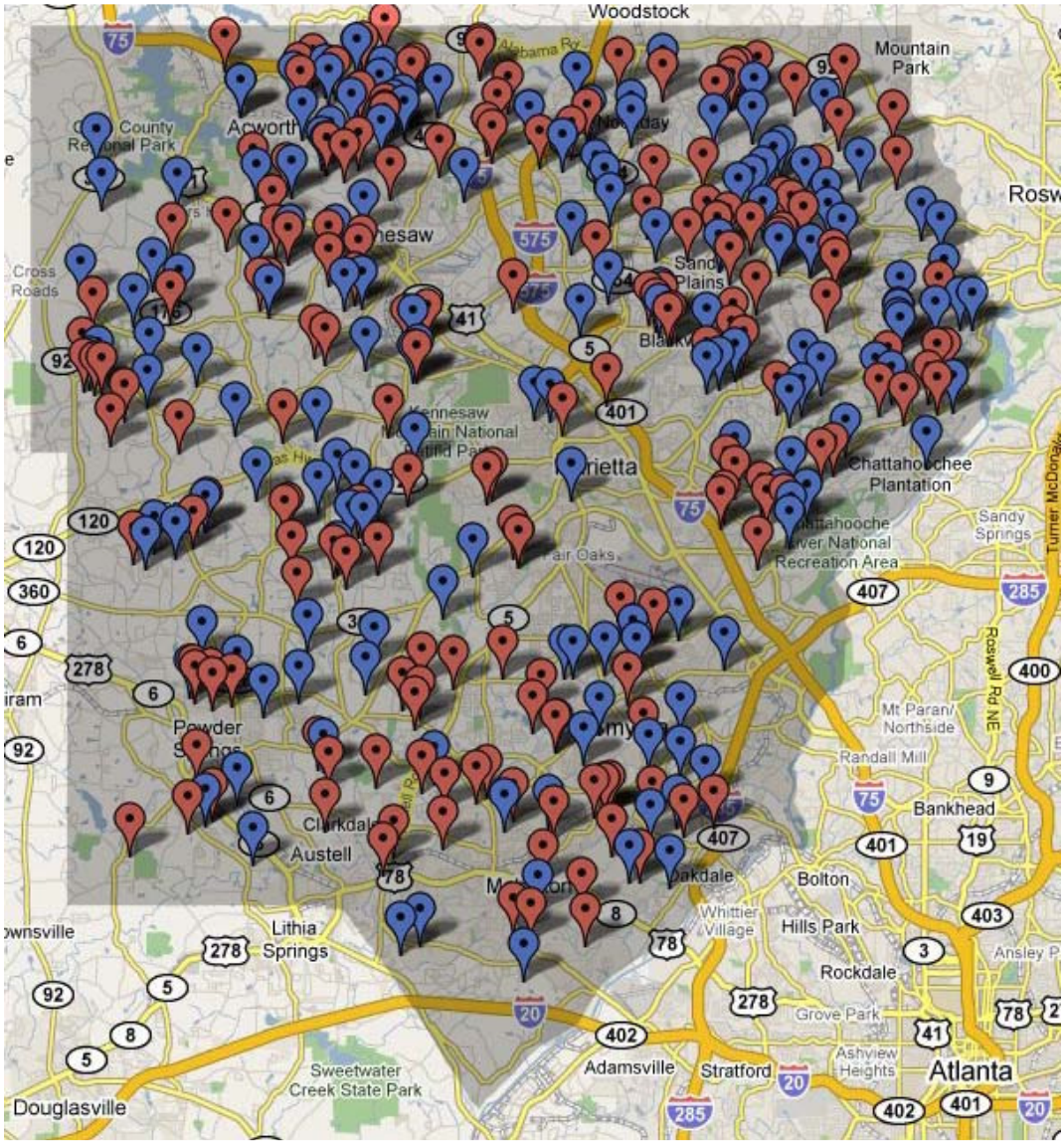
The fourth consideration in our collection of data was to not only collect data within Cobb County, but to make sure we collected a good cross section of homes throughout the entire County. The First Multiple Listing Service actually divides Cobb County into 7 distinct geographic regions (see Table 3.2).

Table 3.2

FMLS GEOGRAPHIC AREAS WITHIN COBB COUNTY		
72	COBB-WEST	Outside I-285, South of Spring Rd. to Concord Rd. to Hurt Rd. To Powder Springs Rd.
73	COBB-WEST	West of I-75 and North of Spring Rd. to Concord Rd. to Hurt Rd. To Powder Springs Rd. and South of State Hwy. 120.
74	COBB-WEST	West of I-75, North of State Hwy. 120, Southwest of Hwy. 41, South of Canton Rd. Connector.
75	COBB-WEST	East of Hwy. 41, West of I-575, North of Canton Rd. Connector.
81	COBB-EAST	Northwest of Sandy Plains Road to I-575.
82	COBB-EAST	North of Hwy. 120, Southeast of Sandy Plains Road.
83	COBB-EAST	South of Hwy. 120 (upper Roswell Rd.) to the Chattahoochee River and outside I-285.

For our data collection, we selected between 20 and 30 home sales from each area and for each year. While we did not have the resources or capacity to use every sale in each area for our data, we collected

approximately a third of the total transactions available. In doing this, we were careful to select homes at every price point that existed within a given area so that our sample was a good representation of the total sales in that area. See Figure 3.2 which shows the location of our sample set of properties and their respective locations within Cobb County. (The red pins represent the dataset from 2006 and the blue pins represent the dataset from 2009.)


Woodstock
Mountain Park
Acworth
Cross Roads
Sandy Plains
Kennesaw
Marietta
Chattahoochee Plantation
Sandy Springs
Chattahoochee River National Recreation Area
Powder Springs
Austell
Clarkdale
Mt Paran/ Northside
Randall Mill
Bankhead
Bolton
Whittier Village
Hills Park
Rockdale
Grove Park
Ashview Heights
Atlanta
Stratford
Adamsville
Lithia Springs
Sweetwater Creek State Park
Douglasville
Roswell Rd NE
Turner McDonald
75
575
41
5
401
120
360
6
278
92
20
285
400
407
9
19
78
8
3
403
402
Figure 3.2

3.2 Sample Data

The data that we collected in terms of housing characteristics was very similar to many of the previous hedonic studies that had been documented by Sirmans, Macpherson and Zietz (2005). Most of the information was obtained by using the First Multiple Listing Service (FMLS) which is only available to real estate agents. In addition to FMLS, we used Realist, which is a tool incorporated into FMLS that pulls property information directly from the tax records. While this was the primary source of data collection, we will discuss some of the other sources of information used to obtain property data as we expand on the actual housing characteristics that we collected.

In terms of the housing characteristics that were used in our regression models, we wanted a well rounded list of housing characteristics encompassed in these three broad categories: Property Characteristics, Community Characteristics, Proximity Characteristics. Similar to Can's approach (1990), we wanted to include more than just structural variables in our hedonic regression models.

The variables that we included in our Building Characteristics section are as follows:

- **Bedrooms:** (the number of bedrooms within a property as listed in FMLS.)
- **Bathrooms:** (the number of bathrooms within a property as listed in FMLS including full baths and half baths.)
- **Square Feet:** (Square Footage is not listed in FMLS, but is included in the Tax record. This variable was collected using Realist.)
- **Age:** (The year built is included in both FMLS and Realist. We used the age of the home at the time of the sale as our variable.)
- **Stories:** (The number of stories is included in FMLS. We did not include basements as an additional story.)
- **Garage:** (The presence of a garage as well as the number of parking spaces is included in both FMLS and Realist.)
- **Basement:** (The presence of a basement is included in FMLS as well as Realist. FMLS also typically mentions whether the basement is a full basement, a finished basement, and/or a daylight basement.)
- **Exterior Construction:** (The exterior construction type is listed in FMLS.)
- **Lot Size:** (The exact lot size is listed by acres in Realist.)
- **Pool:** (The existence of a pool is listed in FMLS.)

- **Floor Covering:** (The types of floor covering are typically listed in FMLS.)
- **General Interior:** (The general interior of a property was determined by pictures and descriptions within FMLS.)
- **General Exterior:** (The general exterior of a property was also determined by pictures and descriptions within FMLS.)

The variables that we used in our community characteristics are as follows:

- **Schools:** (We collected data on each High School District within Cobb County using School-Digger.com. School Digger rates high schools on 1-5 ranking based on standardized test scores.)
- **Swim/Tennis:** (This refers to the existence of a swim and tennis facility available through the neighborhood association for a given property. This information is listed in FMLS.)
- **Crime Statistics:** (Crime stats were collected from the Federal Bureau of Investigation's website and are calculated as a percentage of the total population.)
- **Household Income Levels:** (Median Income levels were collected by zip code using the company Onboard Informatics.)

The variables that we used in our proximity characteristics are as follows:

- **Proximity to Downtown Atlanta:** (We used Google Maps to determine the mileage from a given property to the center of downtown Atlanta. Google actually uses the State Capital Building as the center point of downtown Atlanta.)
- **Proximity to Major Highway:** (Google Maps was used to determine the shortest distance to the closest major highway.)
- **Proximity to Shopping Center:** (Again, Google Maps was used to determine the shortest distance to the closest shopping area.)

3.3 Economic Data

The analysis of our data rests on the notion that the data set from August 2006 is in a good economy compared to the data set from August 2009 in a bad economy. While few people would argue that our country has been in a recession for the last few years, it is still important to know and understand what this information is based on. The National Bureau of Economic Research actually declared that the United States has been in a recession since December 2007 (Rampell, 2008). While this is widely accepted, it was still important for us to look at many of these economic indicators so that this assertion could be backed up with real numbers. The metrics that we used to conclude a down economy were as follows:

- **Unemployment Rate:** (The unemployment rate is a measure of the percentage of the population currently unemployed and is available through the U.S. Department of Labor. We were able to obtain and analyze this data at the national, state and county level.)
- **Consumer Price Index**: (The Consumer Price Index (CPI) is a measure of the average change in prices over time of goods and services. It is the most widely used measure of inflation and is sometimes viewed as an indicator of the effectiveness of

government economic policy. The U.S. Bureau of Labor Statistics releases the updated CPI every month.)

- **Gross Domestic Product**: (The Gross Domestic Product (GDP) is put out by The Bureau of Economic Analysis which falls under the U.S. Department of Commerce. The GDP is generally defined as the output of goods and services produced by labor and property within a particular country and is typically considered a measure of a country's economic performance.)
- **Payroll Employment**: (The Bureau of Labor Statistics publishes quarterly figures at the national and state level in regards to total payroll amounts and percent changes in payroll.)
- **Dow Jones Industrial Average**: (The Dow Jones Industrial Average (DJIA)is an index of large, publically traded companies that is typically used to gauge the performance of the industrial sector of the United States.)
- **New Housing Permits and New Construction**: (The Department of Commerce, Bureau of the Census publishes monthly data on total new construction as well as new private housing. This is a great indicator of what's going on in the real estate market.)

- **Mortgage Delinquencies**: (The percentage of Mortgage Delinquencies by quarter is available through the Mortgage Bankers Association of America. This is also a very good indicator of what's happening in the real estate market.)

3.4 Statistical Analysis

The goal of our study was to determine which characteristics of housing were meaningful to buyers in 2006 as well as 2009 and compare the results. In order to determine which characteristics had a significant impact on the overall price of a home, we used regression analysis. A regression essentially measures the impact of one or more independent variables on a single dependent variable. In our model, the price per square foot for a given property is the dependent variable and all of the other characteristics of the property (i.e. bedrooms, schools, proximity to downtown) are the independent variables. Regression analysis is extremely useful in this scenario because it allows us to measure the individual significance (or insignificance) of each individual variable.

There are two types of regression models that we used to analyze this data. The first model we used is known as the Best Subsets Regression. This model is ideal because it enables you to view different combinations of independent variables that provide the best regression model for further analysis. Using Minitab as the statistical program, we are provided with the following statistical elements for each different grouping of variables: R-Square, Adjusted R-Square, and s statistic.

The R-Square value is essentially a measure of the predictability of the model (i.e. Independent variables in relation to the dependent variable). The R-Square value can range from 0 to 1 where 1 would represent a perfect correlation between the independent and dependent variable(s). The R-Square value is actually derived from the regression sum of squares (the variation attributed to the relationship between the independent variables and the dependent variable) and the residual sum of squares (the variation attributed to the error coefficient). When the Regression Sum of Squares (RSS) is added to the Residual Sum of Squares (SSE), you get the Total Sum of Squares. When the Regression Sum of Squares (RSS) is then compared to Total Sum of Squares, you get the proportion of the total variation explained by the regression model or the R-Square value (Minitab).

The Adjusted R-Square is simply the R-Square value adjusted to more accurately reflect the predictability of the model based on the number of predictors. The S value is essentially the standard deviation from the regression, or the standard distance data values fall from the regression line. As you would expect, the lower the S value, the better the regression model.

The second regression model that we used to analyze this data was the Stepwise Regression Model. Similar to the Best Fit Regression Model, the concept behind this is to determine the best combination of predictor variables. The Stepwise Regression is run automatically through Minitab and is a process whereby a predictor variable is added one step at a time and the program either adds the most significant variable or removes the least significant variable at each step. The Stepwise Regression automatically stops running when all of the variables in the model have a P-value less than the alpha value and all of the variables not in the model have a P-value above the alpha value. Again, the concept is that through the process of addition and elimination, the Stepwise Regression program eventually determines the best set of predictor variables.

P values range from 0 to 1, but the smaller the P value, the better the predictor. The Alpha value that we used in our model and is fairly common in this type of analysis was .05. Thus, the predictors that were determined to be significant in our Stepwise Regression were those that had a P value of less than .05.

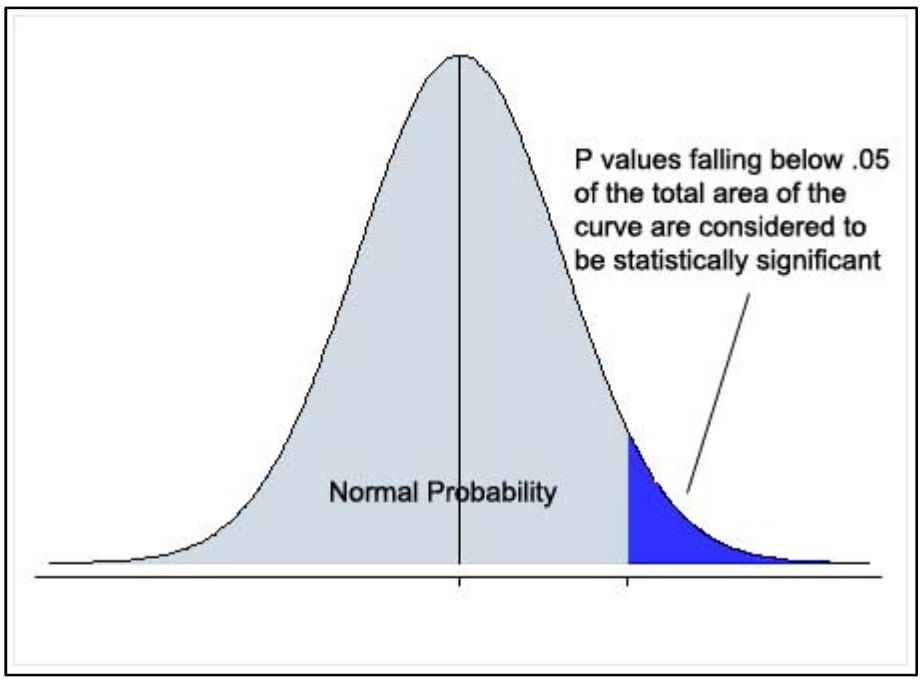
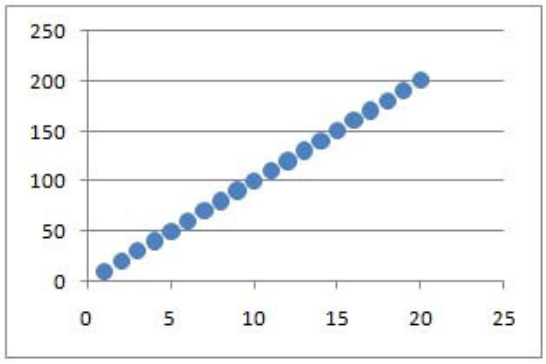
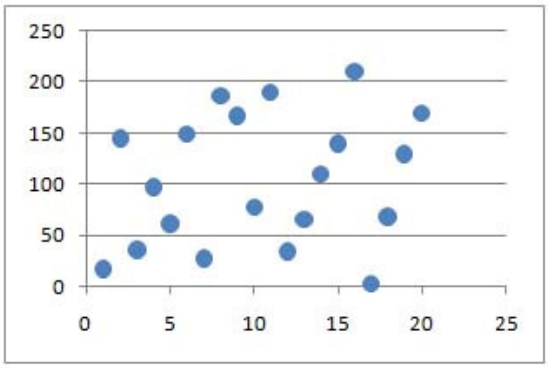


Figure 3.3

Another measurement that we used to analyze our data was the correlation between variables. The correlation between two variables is simply a measure of the linear relationship between those two variables. When working with housing characteristics, it is very common to find that certain variables are highly correlated with each other. For example, there is a fairly consistent relationship between the number of bedrooms and number of bathrooms in a house. Typically, homes with more bedrooms also have more bathrooms. Highly correlated variables are those with coefficients approaching 1 or -1, which would indicate a perfect linear relationship.



1 describes a relationship were an increase in one variable is accompanied by a predictable increase in another variable.



0 describes a random or non-existent relationship

Figure 3.4

In our analysis we used the correlation coefficient as another indicator of the relationship between certain independent variables compared to the dependent variable. Variables with a high correlation to our dependent variable were typically identified as significant in our regression analysis as well.

CHAPTER 4

RESULTS

4.1 Economic Results

As discussed in the Economic Data section of Chapter 3, we wanted to confirm that conventional economic measurements indicate that the economy was in a recession in August 2009. At the very least, we wanted to make sure that our assumption that August 2009 was worse economically as compared to August 2006 was accurate. While The National Bureau of Economic Research declared that we have been in a recession since December 2007, it was still important to understand the facts.

The first measurement of the economy that we looked at was the unemployment rate. Few people would argue that the unemployment rate is an important metric when determining the state of the economy. As you can see in Table 4.1, the unemployment rate was 4.6 in 2006 and began climbing towards the end of 2007 all the way up to 10.2 in August 2009.

Table 4.1

Unemployment Rate (August 2006-Aug 2009)					
Year	Period	labor force	employment	unemployment	unemployment rate
2006	Aug	4740502	4523500	217002	4.6
2006	Sep	4749661	4532327	217334	4.6
2006	Oct	4759952	4540972	218980	4.6
2006	Nov	4763441	4549126	214315	4.5
2006	Dec	4769424	4556661	212763	4.5
2007	Jan	4769550	4563486	206064	4.3
2007	Feb	4771479	4569297	202182	4.2
2007	Mar	4777396	4574086	203310	4.3
2007	Apr	4786644	4577826	208818	4.4
2007	May	4792239	4580778	211461	4.4
2007	Jun	4797945	4582944	215001	4.5
2007	Jul	4802725	4584309	218416	4.5
2007	Aug	4806015	4584924	221091	4.6
2007	Sep	4811983	4584691	227292	4.7
2007	Oct	4816899	4583532	233367	4.8
2007	Nov	4819691	4581558	238133	4.9
2007	Dec	4823467	4578505	244962	5.1
2008	Jan	4827630	4574208	253422	5.2
2008	Feb	4833087	4569736	263351	5.4
2008	Mar	4834846	4564957	269889	5.6
2008	Apr	4838992	4559925	279067	5.8
2008	May	4840682	4554695	285987	5.9
2008	Jun	4842409	4549264	293145	6.1
2008	Jul	4845555	4543706	301849	6.2
2008	Aug	4847831	4537995	309836	6.4
2008	Sep	4852086	4532174	319912	6.6
2008	Oct	4859703	4526309	333394	6.9
2008	Nov	4868341	4520382	347959	7.1
2008	Dec	4880643	4514751	365892	7.5
2009	Jan	4814641	4406663	407978	8.5
2009	Feb	4811586	4371132	440454	9.2
2009	Mar	4783304	4344320	438984	9.2
2009	Apr	4784070	4343910	440160	9.2
2009	May	4771449	4312548	458901	9.6
2009	Jun	4765522	4285901	479621	10.1
2009	Jul	4764573	4274906	489667	10.3
2009	Aug	4744428	4262840	481588	10.2
Data obtained from BLS.gov					

Another economic measurement that we analyzed was the Consumer Price Index (CPI). The CPI is a good measure of inflation and also the strength of the dollar. In August, 2006, the CPI was 199.6 and in August 2009, the CPI had increased to 211.15. While increases like this are not uncommon over a three year period, it does indicate some inflation in the economy which weakens the dollar over time.

The Gross Domestic Product (GDP) is a measurement of the total output of goods and services within a given year. The Bureau of Economic Analysis lists the GDP for the second quarter of 2006 at approximately 102.564. The GDP continued to increase till the beginning of 2008 at which point the recession began to take its toll and the GDP began falling. By the second quarter of 2009, the GDP had fallen back down to 102.082 (See Figure 4.1).

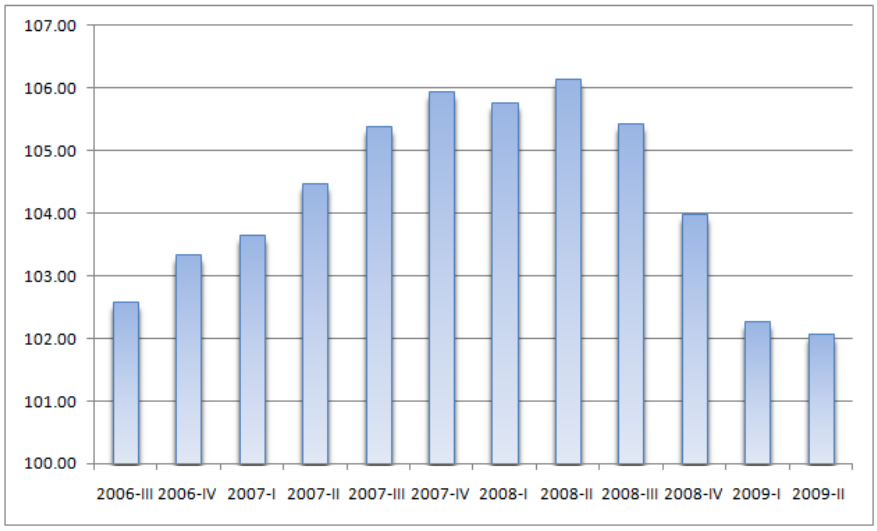
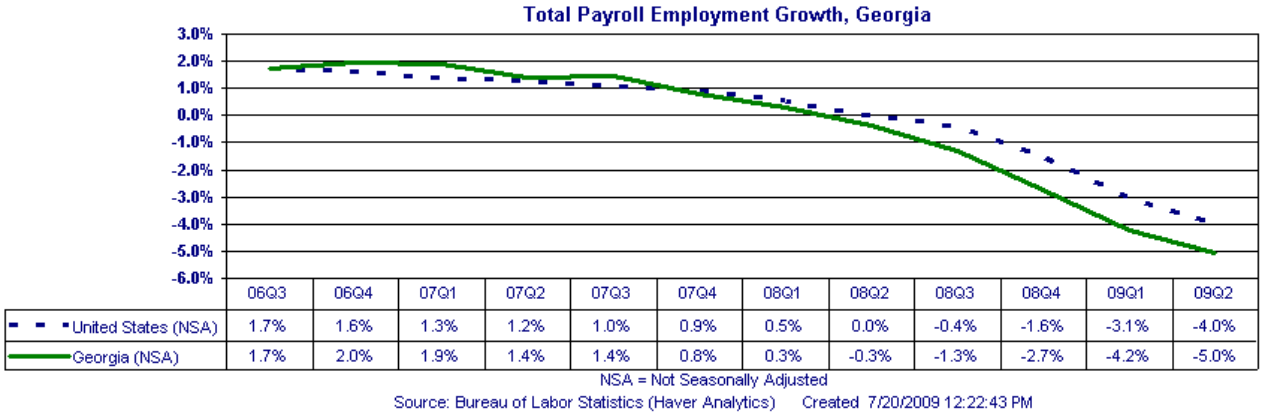


Figure 1: US GROSS DOMESTIC PRODUCT (2006-2009)

Figure 4.1

Another factor within the economy that indicated a downward trend was the payroll declines in the U.S. as well as in Georgia. As you can see in figure 4.2, both the national and state payroll employment growth numbers began declining around the beginning of 2008.

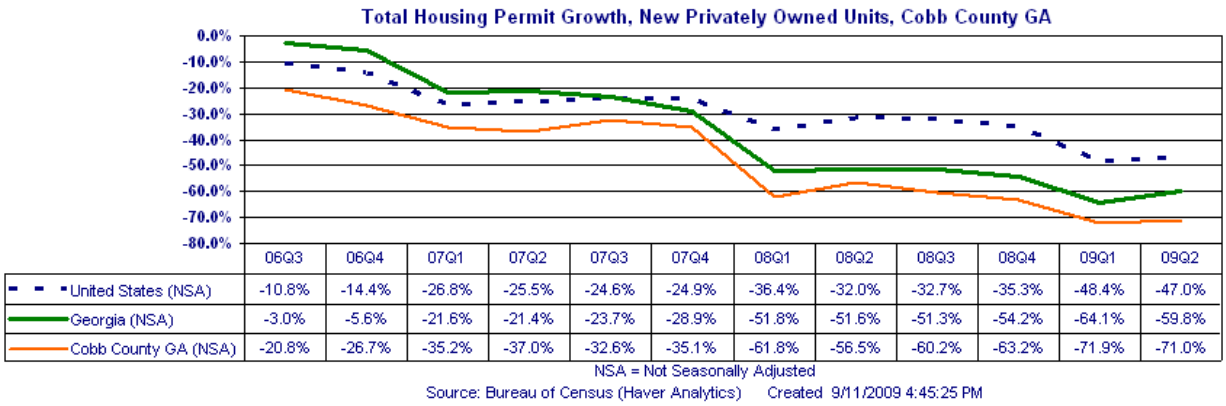


	06Q3	06Q4	07Q1	07Q2	07Q3	07Q4	08Q1	08Q2	08Q3	08Q4	09Q1	09Q2
United States (NSA)	1.7%	1.6%	1.3%	1.2%	1.0%	0.9%	0.5%	0.0%	-0.4%	-1.6%	-3.1%	-4.0%
Georgia (NSA)	1.7%	2.0%	1.9%	1.4%	1.4%	0.8%	0.3%	-0.3%	-1.3%	-2.7%	-4.2%	-5.0%

Figure 4.2

A measurement that the general population often associates with the state of the economy is the Dow Jones Industrial Average (DJIA). The DJIA averaged 11,408 throughout 2006. The market continued to climb in 2007 and actually reached an average of 13,169 for that year. However, the market began steadily falling and actually dipped into the 7000's earlier in 2009 before beginning a slight creep back up to approximately 9000 in August 2009.

In looking at the real estate market, the trends appear to be very similar. New Residential Construction had dropped from approximately 4.68 billion dollars nationwide in 2006 to 1.3 billion as of July 2009. You can see in Figure 4.3 below that new permits in the U.S., Georgia as well as Cobb County have also been on the decline since the third quarter of 2006.



	06Q3	06Q4	07Q1	07Q2	07Q3	07Q4	08Q1	08Q2	08Q3	08Q4	09Q1	09Q2
United States (NSA)	-10.8%	-14.4%	-26.8%	-25.5%	-24.6%	-24.9%	-36.4%	-32.0%	-32.7%	-35.3%	-48.4%	-47.0%
Georgia (NSA)	-3.0%	-5.6%	-21.6%	-21.4%	-23.7%	-28.9%	-51.8%	-51.6%	-51.3%	-54.2%	-64.1%	-59.8%
Cobb County GA (NSA)	-20.8%	-26.7%	-35.2%	-37.0%	-32.6%	-35.1%	-61.8%	-56.5%	-60.2%	-63.2%	-71.9%	-71.0%

NSA = Not Seasonally Adjusted
Source: Bureau of Census (Haver Analytics) Created 9/11/2009 4:45:25 PM

Figure 4.3

In addition to the decrease in new construction, the percentage of mortgage delinquencies in the U.S. as well as in Georgia has been on the rise since 2007 (See Figure 4.4 below).

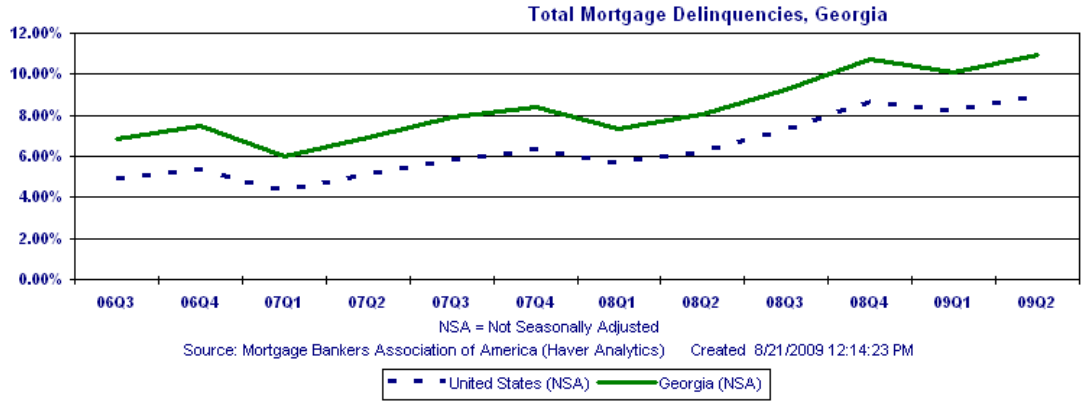


Figure 4.4

Based on this collection of economic data, it is fairly reasonable to conclude that the economy as a whole as well as the local economy was in worse condition in August 2009 than it was August 2006. With high unemployment, a sputtering stock market and almost no new housing, our next analysis will entail how buyers in the Cobb County market react in this type of economy.

4.2 A Change to the Dependent Variable

With most regression analysis studies that relate to real estate prices, the dependent variable is almost always the market price for a particular property, whether that be the sales price or rental price. All of the characteristics of that property (i.e. square footage, bedrooms, proximity factors, etc.) are the independent variables and are the predictors of that market price. One of the very first things we noticed as we began to run the Best Subsets Regression analysis on the 2006 data as well as the 2009 data was that "Square Footage" was an extremely high predictor of sales price by itself. One would assume that square footage would be one of the most important factors in determining the price of a property, but we were surprised to find out to what extent. It turns out that while other factors such as lot size, swim/tennis and proximity to downtown didn't necessarily make the regression model any worse, the best predictor of sales price was simply square footage by itself. For the 2006 data, the regression model using sales price as the dependent variable and only square footage as the independent variable produced a regression model with an Adjusted R-Square value of approx 95% (See Table 4.2 below).

Table 4.2

2006 SUMMARY OUTPUT USING SQUARE FOOTAGE AS THE PREDICTOR OF SALES PRICE

Regression Statistics	
Multiple R	0.977566797
R Square	0.955636842
Adjusted R Square	0.950317693
Standard Error	55488.77495
Observations	189

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.24692E+13	1.247E+13	4049.7506	1.1608E-128
Residual	188	5.78853E+11	3.079E+09		
Total	189	1.30481E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	10148.66564	159.4758057	63.637651	3.93E-129	9834.073676	10463.26	9834.073676	10463.25761

The results were similar for 2009 as well. We ran the same regression using sales price as the dependent variable and square footage as the independent variable. This produced a regression with an adjusted R-Square value of approximately 92% (See Table 4.3 below).

Table 4.3

2009 SUMMARY OUTPUT USING SQUARE FOOTAGE AS THE PREDICTOR OF SALES PRICE

Regression Statistics	
Multiple R	0.96288595
R Square	0.92714936
Adjusted R Square	0.92101439
Standard Error	72521.0088
Observations	164

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1.09102E+13	1.09E+13	2074.455	2.94431E-94
Residual	163	8.57265E+11	5.26E+09		
Total	164	1.17674E+13			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
X Variable 1	9678.34294	212.495161	45.54618	1.26E-94	9258.74477	10097.941	9258.74477	10097.94111

Based on the fact that square footage is such a strong indicator of sales price in Cobb County, we decided to change the dependent variable in our analysis to "Price per Square Foot" instead of just "Price." Our hope in this study was to see how all characteristics of housing contribute to the overall value that a buyer places on a property. Since "Square Footage" seems to drown out the other variables, we thought that if we could incorporate this into the dependent variable, perhaps we could gain insight into how the other housing characteristics factor into a "Price/SF" comparison.

Moving forward with the analysis simply involved creating another column in our dataset for "Price/SF." We also identified the few number of houses in both sets of data that were located on lots greater than one acre and removed them from dataset. This was only 5 properties in 2006 and 4 properties in 2009. Considering the fact that "Price/SF" was the new dependent variable, we wanted to reduce the variability caused by properties with large lots where much of the value came from the size of the lot rather than just the square footage in the property.

4.3 Statistical Analysis

The first step in our statistical analysis was to get a general idea of how "Price/SF" was distributed for both years. To do this, we created a histogram which categorized the percent of properties falling within a given range of price per square foot values (see Figure 4.5). As would be expected, the percentage of properties at lower price points ($40/SF to $80/SF) is greater for the 2009 properties whereas the percentage of properties at the higher price points (from $90/SF and higher) is greater for the 2006 properties.

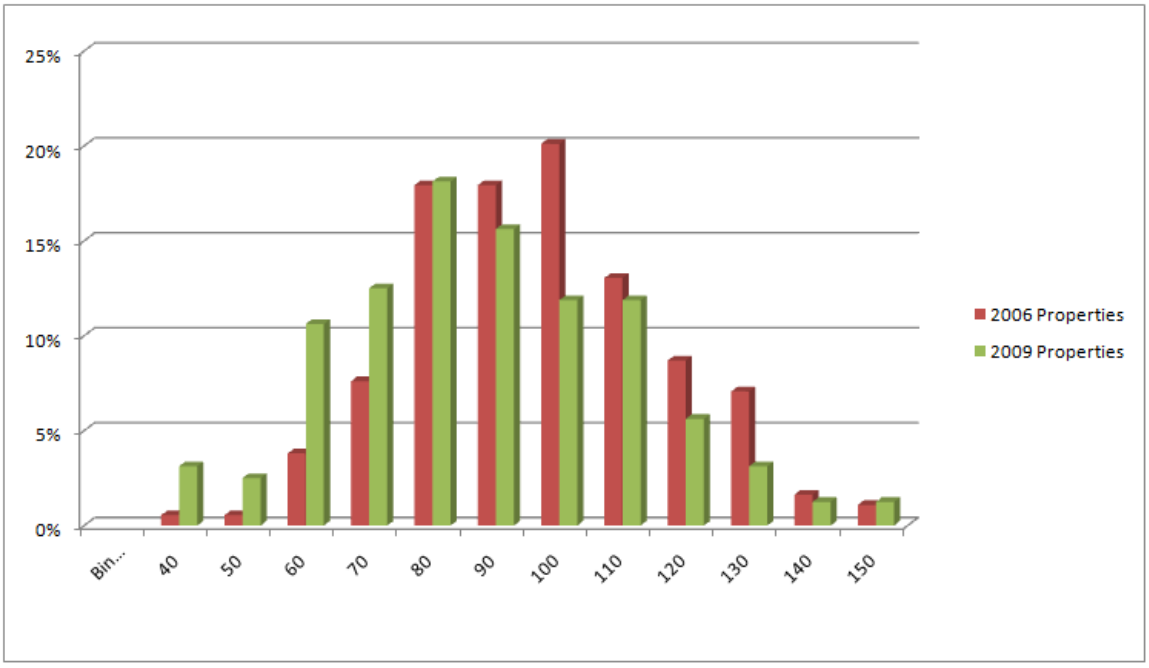


Figure 4.5

The next step in our analysis was to examine the correlation factors between "Price/SF" and all of the other variables. Once both of the correlations were run through Minitab, we ordered them from the highest correlation to the least (See Table 4.4 below).

Table 4.4

2006 Correlation Factors	
Variable	Correlation
General Interior	0.223
Swim/ Tennis	0.208
Proximity to Downtown	0.163
Stories	-0.147
Floor Covering	0.138
Crime Stats	0.136
Yr Built/Age	-0.118
General Exterior	0.115
Household Income	0.109
Schools	0.102
Basement	0.095
Exterior Const	0.092
Lot Size	-0.075
Garage	-0.053
Bath	0.051
Prox. To Major Hwy	-0.029
Proximity to shopping	-0.029
Bed	-0.018
Pool	0.012

2009 Correlation Factors	
Variable	Correlation
General Interior	0.396
Exterior Construction	0.371
Pool	0.285
Floor Covering	0.285
Household Income	0.274
Schools	0.263
Proximity to Downtown	0.262
Proximity to Shopping	0.241
Crime Stats	0.235
Bath	0.195
Basement	0.16
General Exterior	0.141
Bed	0.133
Garage	0.09
Yr Built/Age	-0.048
Lot Size	0.044
Stories	-0.032
Swim/Tennis	-0.025
Proximity to Major Hwy	0.016

At an initial glance of these two sets of correlation values, it is interesting to observe that the 2009 variables appear to be relatively more correlated to "Price/SF" than the 2006 variables. While neither set has significantly high correlations to "Price/SF," it is interesting to note the differences between the two sets of data. While some variables are at the

top of both lists (such as "General Interior") others are very different between each set of data. For example, "Swim/Tennis" is second from the top in 2006, but it is second from the bottom in 2009.

While correlation factors are interesting to note, it is still important to see which factors the regression analysis determines to be significant. However, based on the results of this correlation comparison, we would expect to see most of the variables at the top of these lists in the following regression models.

The next step in our statistical analysis of the data was to run the Stepwise Regression for each set of data. With the use of Minitab, the Stepwise Regression should provide us with a regression model that contains the most significant variables for each year. The first Stepwise Regression was run on the 2006 data. All of the previously listed characteristics were run as the independent variables and "Price/SF" as the dependent variable. Our results were as follows (See Table 4.5 below):

Table 4.5

Stepwise Regression: 2006 Data Set

Alpha-to-Enter: 0.05 Alpha-to-Remove: 0.05

Response is Price/Sf on 19 predictors, with N = 165
N(cases with missing observations) = 19 N(all cases) = 184

Step	1	2	3	4	5	6
Constant	84.90	33.62	18.31	19.38	34.86	29.20
Proximity to Downtown	0.97	1.61	1.61	1.69	1.56	1.25
T-Value	3.22	4.73	4.84	5.12	4.76	3.56
P-Value	0.002	0.000	0.000	0.000	0.000	0.000
Schools		7.9	8.2	7.5	7.2	7.3
T-Value		3.61	3.82	3.47	3.41	3.50
P-Value		0.000	0.000	0.001	0.001	0.001
General Interior			5.7	5.1	6.0	6.4
T-Value			2.72	2.42	2.85	3.08
P-Value			0.007	0.017	0.005	0.002
Swim/ Tennis				7.0	8.4	8.0
T-Value				2.33	2.80	2.69
P-Value				0.021	0.006	0.008
Stories					-8.6	-9.0
T-Value					-2.55	-2.71
P-Value					0.012	0.007
Proximity to shopping						1.43
T-Value						2.25
P-Value						0.026
S	19.7	19.0	18.6	18.4	18.1	17.8
R-Sq	6.00	12.98	16.82	19.54	22.70	25.09
R-Sq(adj)	5.42	11.91	15.27	17.53	20.27	22.25
Mallows Cp	32.3	19.9	14.0	10.4	5.9	3.0

The Stepwise Regression process cycled through 6 steps until it concluded with the results shown above listing the 6 variables that were considered to be good predictors based on an alpha value of .05. Next we ran the Stepwise Regression for the 2009 data (see Figure 4.6).

Table 4.6

Stepwise Regression: 2009 Data Set

Alpha-to-Enter: 0.05 Alpha-to-Remove: 0.05

Response is Price/Sf on 19 predictors, with N = 138
N(cases with missing observations) = 22 N(all cases) = 160

Step	7	8	9	10	11
Constant	-12.14	-14.56	-22.15	-38.85	-40.15
General Interior	10.2	13.1	9.0	6.4	
T-Value	3.19	4.54	2.62	1.79	
P-Value	0.002	0.000	0.010	0.076	
Proximity to Shopping					
T-Value					
P-Value					
Pool	30.2	28.4	28.1	27.5	28.0
T-Value	3.94	3.69	3.70	3.67	3.71
P-Value	0.000	0.000	0.000	0.000	0.000
Exterior Construction	6.4				
T-Value	1.94				
P-Value	0.054				
Household Income Levels	0.00048	0.00054	0.00055	0.00039	0.00037
T-Value	3.89	4.52	4.63	2.88	2.71
P-Value	0.000	0.000	0.000	0.005	0.008
Proximity to Downtown	1.68	1.83	1.93	2.29	2.47
T-Value	4.53	5.01	5.30	5.79	6.43
P-Value	0.000	0.000	0.000	0.000	0.000
Floor Covering			6.3	6.5	9.4
T-Value			2.12	2.23	3.78
P-Value			0.036	0.027	0.000
Schools				5.6	7.2
T-Value				2.16	2.89
P-Value				0.032	0.004
S	20.8	21.0	20.8	20.5	20.7
R-Sq	40.07	38.35	40.38	42.43	41.02
R-Sq(adj)	37.80	36.50	38.12	39.80	38.79
Mallows Cp	10.1	12.0	9.4	6.8	8.0

The Stepwise Regression for 2009 cycled through 11 steps before obtaining a regression with 5 variables and an Adjusted R-Square value of 38.79%. Something interesting to note is the fact that the 2009 data has a relatively higher Adjusted R-Square than the 2006 data. Also interesting to note are the variables that were significant in both years as well as the variables that were not (See Table 4.7).

Table 4.7

2006 Stepwise Regression with Correlation		
Variable	Corr.	P-Value
General Interior	0.223	0.002
Swim/ Tennis	0.208	0.008
Proximity to Downtown	0.163	0.000
Stories	-0.147	0.007
Floor Covering	0.138	
Crime Stats	0.136	
Yr Built/Age	-0.118	
General Exterior	0.115	
Household Income	0.109	
Schools	0.102	0.001
Basement	0.095	
Exterior Const	0.092	
Lot Size	-0.075	
Garage	-0.053	
Bath	0.051	
Prox. To Major Hwy	-0.029	
Proximity to shopping	-0.029	0.026
Bed	-0.018	
Pool	0.012	

2009 Stepwise Regression with Correlation		
Variable	Corr.	P-Value
General Interior	0.396	
Exterior Construction	0.371	
Pool	0.285	0.000
Floor Covering	0.285	0.000
Household Income	0.274	0.008
Schools	0.263	0.004
Proximity to Downtown	0.262	0.000
Proximity to Shopping	0.241	
Crime Stats	0.235	
Bath	0.195	
Basement	0.16	
General Exterior	0.141	
Bed	0.133	
Garage	0.09	
Yr Built/Age	-0.05	
Lot Size	0.044	
Stories	-0.03	
Swim/Tennis	-0.03	
Proximity to Major Hwy	0.016	

Another interesting observation in this table is the fact that the top two variables for the 2009 correlation comparison were not included in the final Stepwise Regression model. To double check the significance of these two variables, we ran another multi-variable regression that included these two variables in addition to the five that were produced by the Stepwise Regression. The results of this regression are as follows (See Table 4.8):

Table 4.8

Regression Analysis: 2009 Data Set

148 cases used, 12 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-39.93	16.53	-2.42	0.017
General Interior	7.165	3.482	2.06	0.041
Pool	25.854	7.160	3.61	0.000
Floor Covering	5.445	2.729	2.00	0.048
Schools	6.275	2.542	2.47	0.015
Household Income Levels	0.0003954	0.0001336	2.96	0.004
Proximity to Downtown	2.1256	0.3746	5.67	0.000
General Exterior	0.506	2.890	0.18	0.861

S = 20.2949 R-Sq = 41.7% R-Sq(adj) = 38.8%

Based on these results, the "General Exterior" variable does indeed have a P-value that is too high to be considered significant. The "General Interior" variable, however, does still fall within the range of significance. We ran one more regression analysis with the 2009 data that did not include "General Exterior," but did include "General Interior" (See Table 4.9).

Table 4.9

Regression Analysis: 2009 Data Set

148 cases used, 12 cases contain missing values

Predictor	Coef	SE Coef	T	P
Constant	-39.19	15.92	-2.46	0.015
General Interior	7.218	3.457	2.09	0.039
Pool	26.085	7.013	3.72	0.000
Floor Covering	5.520	2.686	2.06	0.042
Schools	6.279	2.533	2.48	0.014
Household Income Levels	0.0003951	0.0001331	2.97	0.004
Proximity to Downtown	2.1253	0.3733	5.69	0.000

S = 20.2251 R-Sq = 41.7% R-Sq(adj) = 39.2%

This final regression for the 2009 data produces a model where the Adusted R-Square is 39.2, which is higher than the Stepwise Regression, and one in which all of the variables have statistically significant P-values. Based on these results, we include "General Interior" as a variable that has significance for our 2009 data (see Table 4.10).

Table 4.10

2006 Regression with Correlation		
Variable	Corr.	P-Value (Stepwise
Adjusted R-Square		**22.25**
General Interior	0.223	0.002
Proximity to Downtown	0.163	0.000
Schools	0.102	0.001
Stories	-0.147	0.007
Swim/ Tennis	0.208	0.008
Proximity to shopping	-0.029	0.026

2009 Regression with Correlation			
Variable	Corr.	P-Value (Stepwise)	P-Value (Regression)
Adjusted R-Square		**38.79**	**39.2**
General Interior	0.396		0.039
Proximity to Downtown	0.262	0.000	0.000
Schools	0.263	0.004	0.014
Household Income	0.274	0.008	0.004
Pool	0.285	0.000	0.000
Floor Covering	0.285	0.000	0.042

Table 4.10 is a great summation of the comparison between the regressions for each set of data. Each set of data has six variables that were determined to be significant in predicting "Price/SF" for each year. Three of the variables were significant in each year (highlighted in yellow in Table 4.10) and the other three variables were unique to their respective years. In addition to the unique variables for each year, it is also interesting to observe the higher correlations in 2009 as well as the higher Adjusted R-Square values for the 2009 regressions.

The last step in determining the statistically significant variables was to run the Best Subsets Regression to confirm the results of our previous analysis. We ran the first Best Subsets Regression on the 2006 data (See Table 4.11).

Table 4.11

Best Subsets Regression: 2006 Data Set

Vars	R-Sq	R-Sq(adj)	Mallows Cp	S	Bed	Bath	Stories	Br/Age	Bus/Trans	Garage	Beams	Exterior	Cond	Lot Size	Pool	Fireplace	Central Air	Gen Heat	Gen Elec	Sw/Ceiling Fans	Cent Vac	Security	Hot Tub/Spa	Indoor Lndry	Proximity to Downtown	Proximity to Hwy.	Proximity to Mass Transit
1	6.0	5.4	32.3	19.669																					X		
1	5.4	4.8	33.6	19.737																							X
2	13.0	11.9	19.9	18.983																X					X		
2	11.1	10.0	23.8	19.188																	X				X		
3	16.8	15.3	14.0	18.617													X			X					X		
3	16.6	15.0	14.5	18.642																X	X				X		
4	19.5	17.5	10.4	18.367													X			X	X				X		
4	19.2	17.2	11.1	18.403													X			X					X		X
5	22.7	20.3	5.9	18.060			X										X			X	X				X		
5	21.7	19.2	8.0	18.180			X										X			X					X		X
6	25.1	22.2	3.0	17.834			X										X			X	X				X		X
6	23.8	20.9	5.7	17.989	X												X			X	X				X		X
7	25.8	22.5	3.6	17.809	X		X										X			X	X				X		X
7	25.7	22.4	3.7	17.814			X								X		X			X	X				X		X
8	26.7	23.0	3.6	17.750	X		X				X						X			X	X				X		X
8	26.6	22.8	3.9	17.767	X		X								X		X			X	X				X		X
9	27.5	23.2	4.1	17.720	X		X								X		X			X	X				X	X	X
9	27.3	23.1	4.4	17.733	X		X				X				X		X			X	X				X		X
10	28.0	23.4	4.9	17.705	X		X				X				X		X			X	X				X	X	X
10	27.9	23.2	5.3	17.725	X		X					X			X		X			X	X				X	X	X

The Best Subsets Regression appears to have confirmed the Stepwise results. The Adjusted R-Square value of 22.2% with only 6 variables appears to be the best fit. By introducing additional variables

beyond this 6, there is only a marginal increase in the Adjusted R-Square value, thus we have highlighted the Best Subsets model with 6 variables (Table 4.11). This list of variables is identical to the variables that were produced using the Stepwise Regression.

Next, we ran the Best Subsets Regression on the 2009 data to confirm the best regression was used to determine the significance of our housing variables (see Table 4.12).

Table 4.12

2009 Best Subsets Regression

Vars	R-Sq	R-Sq(adj)	Mallows Cp	S	Bedhs	Bathse	Stolen/Age	Yr Built	Garage	Exterior Cond	Basement	Lot Size	Porch	Fleor Conv	Gen Fair	Gen Ave	Sw Im/To	Ext Scheme	Ins (Ve Lens)	Hous Ins Cost	Prox Idty	Prox Mid Dist	Prox to Hwy
1	14.8	14.2	59.5	24.452											X								
1	13.5	12.8	62.6	24.645						X													
2	24.9	23.7	38.7	23.050													X				X		
2	23.7	22.5	41.4	23.233						X		X											
3	32.1	30.5	24.3	22.000											X					X	X		
3	31.8	30.3	24.8	22.036								X					X				X		
4	38.4	36.5	12.0	21.034								X			X					X	X		
4	37.7	35.9	13.4	21.138								X	X				X				X		
5	41.0	38.8	8.0	20.651								X	X				X			X	X		
5	40.4	38.1	9.4	20.764								X	X	X						X	X		
6	42.6	40.0	6.3	20.445						X		X	X				X			X	X		
6	42.4	39.8	6.8	20.481								X	X	X			X			X	X		
7	44.0	40.9	5.3	20.284		X	X					X	X				X			X	X		
7	43.6	40.6	6.1	20.351		X	X					X	X	X						X	X		
8	45.3	41.9	4.2	20.116		X	X					X	X	X			X			X	X		
8	44.8	41.4	5.3	20.202	X	X	X					X	X	X						X	X		
9	46.2	42.4	4.2	20.032	X	X	X					X	X	X			X			X	X		
9	45.8	42.0	5.1	20.105		X	X		X			X	X	X			X			X	X		
10	46.9	42.7	4.6	19.978	X	X	X			X		X	X	X			X			X	X		
10	46.8	42.6	5.0	20.005	X	X	X		X			X	X	X			X			X	X		

The Best Subsets Regression for 2009 was not quite as cut and dry. There are a few different regression models that produce fairly similar results in terms of Adjusted R-Square (see highlighted rows in Table 4.12). Some of the models that are produced using six variables include "Exterior

Construction" and the model with five variables does not include "General Interior." However, we ran into a similar situation when we ran the Stepwise Regression on the 2009 data and determined that the "Exterior Construction" did not have a significant enough P-Value and that "General Interior" was significant enough to include in our results. For the most part, the Best Subsets Regression for 2009 still points to the same variables that we identified previously.

4.4 Exploring the Results

Based on the results of the regression analyses, we were hopeful that changes in buying patterns might be identified as a result of the changed economic conditions. To do this, we created a summary of the regression results for 2006 and compared them to 2009 (See Table 4.13).

Table 4.13

2006 Regression with Correlation		
Variable	Corr.	P-Value (Stepwise
Adjusted R-Square		**22.25**
General Interior	0.223	0.002
Proximity to Downtown	0.163	0.000
Schools	0.102	0.001
Stories	-0.147	0.007
Swim/ Tennis	0.208	0.008
Proximity to shopping	-0.029	0.026

2009 Regression with Correlation			
Variable	Corr.	P-Value (Stepwise)	P-Value (Regression)
Adjusted R-Square		**38.79**	**39.2**
General Interior	0.396		0.039
Proximity to Downtown	0.262	0.000	0.000
Schools	0.263	0.004	0.014
Household Income	0.274	0.008	0.004
Pool	0.285	0.000	0.000
Floor Covering	0.285	0.000	0.042

The most obvious difference between the data for 2006 and 2009 is the Adjusted R-Square value. The regression models for 2009 indicate an Adjusted R-Square value of approximately 39% while the regression models for 2006 are only 22%. Again, the R-Square value represents the predictability of the identified variables (i.e. housing characteristics) in terms of "Price/SF."

In analyzing the sets of variables that were identified by the regression analysis, there are some similarities and some differences. We start by breaking down housing characteristics into a few different

classifications such as Structural (Housing) Elements, Aesthetic (Housing) Elements, Locational Elements, etc. We then classified the various characteristics that were identified by the regression analysis for each year and place them into their respective categories (See Table 4.14).

Table 4.14

2006/2009 Comparison	2006 Data	2009 Data
Structural (Housing) Element	Stories	
Asthetic (Housing) Element	General Interior	General Interior, Flooring
Amenity	Swim/Tennis	Pool
Locational Element	Proximity to Shopping, Proximity to Downtown, Schools	Proximity to Downtown, Schools
Demographic Element		Median Income

While there are differences in which variables are the best predictors for each year, the two sets of variables are actually fairly similar to each other. An obvious observation is the fact that there are 3 predictors common to each set of data ("General Interior", "Proximity to Downtown" and "Schools" as highlighted in Figure 4.14). Another similarity is the concept of having a pool as an amenity. The swim/tennis amenity was identified as a significant factor in 2006 and the existence of a pool on the property appears to be significant in 2009. While these are not the same, they are both amenities that provide for a swimming pool, whether it be at the neighborhood club or in the backyard.

In terms of differences, it is interesting to note that the number of stories has a statistically significant negative correlation in 2006. Also, the

flooring turned out to be statistically significant in 2009 but not in 2006. This category is a somewhat subjective and aligns fairly closely with General Interior. In fact, when looking at the correlation factor between General Interior and Flooring for 2009, there is a factor of 0.566 which is very high as compared to the other variables. Based on this, it is not surprising that if the general interior condition was identified as a significant variable, then flooring could be as well.

Another interesting difference between the 2006 and 2009 data set was the fact that "Proximity to Shopping" was identified as significant in 2006 but not in 2009. While this research does not attempt to explain this, it is still an interesting difference to observe. Also, in 2009 "Median Income" proved to be significant but this was not the case in 2006.

4.5 Additional Observations

In addition to identifying which variables were most significant for each year, our data collection also provided us an opportunity to analyze which characteristics of housing helped to insulate against large drops in value. Based on our data sets, we calculated an average Price/SF drop of over 6.5% from 2006 to 2009 in all of Cobb County. However, when we look closer, it is clear that certain areas were affected with large drops in value while some areas actually increased in value. With the significant characteristics of housing identified for each year, we performed some additional analysis to attempt to understand which combination of characteristics help prevent home values from dropping.

The first analysis that we performed was geographically based. FMLS divides Cobb County into 7 separate regions that we were able to study individually. Using these 7 different geographic areas, we calculated the average "Price/SF" for both the 2006 and 2009 data set. We then analyzed the percent change in each area from 2006 to 2009 (See Table 4.15).

Table 4.15

Geographic Area Comparison			
FMLS AREAS	Average Price/Sf	Average Price/Sf	% Change
AREA 72	104.15	91.75	-11.91%
AREA 73	97.86	86.73	-11.37%
AREA 74	114.68	89.12	-22.29%
AREA 75	89.77	85.34	-4.93%
AREA 81	103.82	99.3	-4.35%
AREA 82	111.66	115.4	3.35%
AREA 83	115.63	123.93	7.18%

This calculation is interesting because it confirms that some areas decreased in value while some areas actually increased. Our next step was to look at some of our predictor variables within these different geographic areas to see if there might be an explanation as to why some of the areas decreased in value and others actually increased. Using this same chart, we added a column for Average Median Income and another column for Average School Rating (See Table 4.16).

Table 4.16

Geographic Area Comparison					
FMLS AREAS	2006 Average Price/Sf	2009 Average Price/Sf	% Change	Average Median Income	Average School Rating
AREA 72	104.15	91.75	-11.91%	$66,103	2.4
AREA 73	97.86	86.73	-11.37%	$65,203	3
AREA 74	114.68	89.12	-22.29%	$76,788	4
AREA 75	89.77	85.34	-4.93%	$77,216	4.3
AREA 81	103.82	99.3	-4.35%	$81,120	4.25
AREA 82	111.66	115.4	3.35%	$107,162	4.3
AREA 83	115.63	123.93	7.18%	$87,010	4.5

In analyzing the "Price/SF" in the different geographic areas, it became immediately clear that the areas that dropped in value had lower median incomes and poorer school ratings versus the areas that did not drop in value. In fact the two areas that had the highest income and highest average school rating were the only two areas that experienced an actual increase in average "Price/SF." As a side note, it is not surprising that "Median Income" and "School Rating" appear to track each other. There is a very high correlation factor in our data (.612) between "Median Income" and "School Rating."

To further explore what kind of affect the "School Rating" might have on values, we calculated average "Price/SF" for 2006 and 2009 based only on the school rating. This comparison also indicated that in areas with poor school ratings, home values experienced a significant drop in value. We found that homes in school districts with a category 1 or 2 dropped the worse. Category 1 school districts dropped on average 27.41% and category 2 school districts dropped 32.66% (See Table 4.17).

Table 4.17

Price/SF Comparison by School Rating			
School Category	2006 Avg Price/SF	2009 Avg Price/SF	Percent Change
1	99.07	71.91	-27.41%
2	102.52	69.04	-32.66%
3	100.2	95	-5.19%
4	98.8	91.34	-7.55%
5	106.33	100.5	-5.48%

To further understand how the school district combined with our other predictor variables were affecting values, we created additional tables comparing the school rating to the general interior (Table 4.18).

Table 4.18

2006 Interior to School Comparison					
Interior	School 1	School 2	School 3	School 4	School 5
Below Avg.	57.2		91.38	70.64	84.22
Average	111.63	108.01	99.31	94.48	106.48
Above Avg.		101.51	105.31	107.15	110.52
Well Above Avg.	103.29		100.49	105.87	

2009 Interior to School Comparison					
Interior	School 1	School 2	School 3	School 4	School 5
Below Avg.	58.27	55.81	84.76	71.27	86.76
Average	112.85	71.68	92.48	86.7	96.57
Above Avg.			108.99	106.42	115.14
Well Above Avg.			107.13		86.01

2006-2009 Interior to School Percent Change					
Interior	School 1	School 2	School 3	School 4	School 5
Below Avg.	2%		-7%	1%	3%
Average	1%	-34%	-7%	-8%	4%
Above Avg.			3%	-1%	4%
Well Above Avg.			7%		

Based on these results, it appears as though homes in the category 5 school districts hold their value regardless of the interior condition of the homes. Additionally, homes in school districts with a rating of 3 experience some increases as well when the general interior of the homes are above average or well above average.

To further explore the effect of the school system on depreciating home values, we created a comparison of school quality in relation to the proximity to downtown (see Table 4.19).

Table 4.19

2006 Schools and Proximity Comparison					
School	0-10 mi	11-15 mi	16-20 mi	21-25 mi	26 beyond
1					93.37
2			78.78	108.46	
3			105.33	91.4	108.08
4	87.78	94.95	98.3	115.89	109.25
5	106.09	93.49	118.74	116.7	

2009 Schools and Proximity Comparison					
School	0-10 mi	11-15 mi	16-20 mi	21-25 mi	26 beyond
1			71.91		
2					69.04
3			90.55	89.23	109.34
4		83.85	83.03	120.97	114.68
5	93.52	92.03	105.98	129.85	

2006-2009 Schools and Proximity Percent Change					
School	0-10 mi	11-15 mi	16-20 mi	21-25 mi	26 beyond
1					
2					
3			-14%	-2%	1%
4		-12%	-16%	4%	1%
5	-12%	-2%	-11%	11%	

Interestingly, we find that the category 4 and 5 school districts actually increase in value from 21 to 25 miles away. However, as we get closer to downtown, all of the school districts, regardless of the school rating, experience declines in value. This would seem to indicate that even though proximity to downtown is a significant factor in determining the Price/SF of a home, there is still a more stable housing market farther away from downtown in combination with good school districts.

Lastly, we analyzed the proximity to downtown in relationship to general interior condition (See Table 4.20).

Table 4.20

2006 Interior to Proximity Comparison					
Interior	0-10 Miles	11-15 Miles	16-20 Miles	21-25 Miles	25 Miles beyond
Below Avg		82.75		87.04	77.91
Average	102.53	89.72	101.08	105.76	104.65
Above Avg	98.46	103.78	107.06	115.93	118.89
Well Above Avg		107.01	108.14	65.72	103.29

2009 Interior to Proximity Comparison					
Interior	0-10 Miles	11-15 Miles	16-20 Miles	21-25 Miles	25 Miles beyond
Below Avg	72.75	68.78	58.27	86.13	55.81
Average	83.27	84.14	90.35	107.43	85.83
Above Avg	74.92	96.63	116.56	122.8	123.2
Well Above Avg		86.01			107.13

2006-2009 Interior to Proximity Percent Change					
Interior	0-10 Miles	11-15 Miles	16-20 Miles	21-25 Miles	25 Miles beyond
Below Avg		-17%		-1%	-28%
Average	-19%	-6%	-11%	2%	-18%
Above Avg	-24%	-7%	9%	9%	4%
Well Above Avg		-20%			4%

Again, we find that homes a little farther away from downtown seem to hold their value or even increase in value better than the homes closer to town. This appears to be true at least for homes with above average interiors. This is especially true for the 21 to 25 mile distance from downtown where even the homes with average interiors have an increase in Price/SF.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

Through the use of statistical analysis, we were able to identify different buying patterns in a good economy and a bad economy. Our regression models helped us to identify which characteristics of housing were the most significant at each point in time. We were also able to further identify how some of those significant characteristics could actually help certain properties maintain their value in a declining market while other properties in the same region were depreciating.

The results of our regression analysis revealed that there were some similarities and some difference in regards to which characteristics of housing were significant in determining the value that buyers place on residential properties in a good economy versus a bad economy. For instance, in 2006, buyers placed a higher value on one-story properties whereas this was not a significant factor for homebuyers in 2009. In addition, there was also a greater significance placed on the proximity to the closest shopping area in 2006 versus 2009. While our research does not speculate as to why this is the case, we would recommend that further research be conducted to understand why homebuyers placed more significance on certain variables from one real estate market to the next.

Another difference that was identified between the two years was the predictability of housing characteristics in relationship to "Price/SF." The R-Square value for the 2006 regression models was approximately 22% in 2006 versus 39% in 2009. In addition, the housing characteristics in 2009, as a whole, had higher correlation values in relationship to "Price/SF." Further research could be conducted to analyze why the correlations and the predictability of the regression model appear to be higher in the down real estate market.

Another finding in our research was the fact that the quality of the school district, the proximity to downtown and the general quality of the interior all proved to be important housing characteristics in both 2006 and 2009. As we analyzed these characteristics in more depth, we found that in Cobb County, homes that were approximately 20-25 miles away from downtown experienced less depreciation than other areas. This was especially true when the homes had an above average interior and were located in good school districts. In fact, homes in this general proximity to downtown that were in good condition and located in good school districts, on average, actually increased in value.

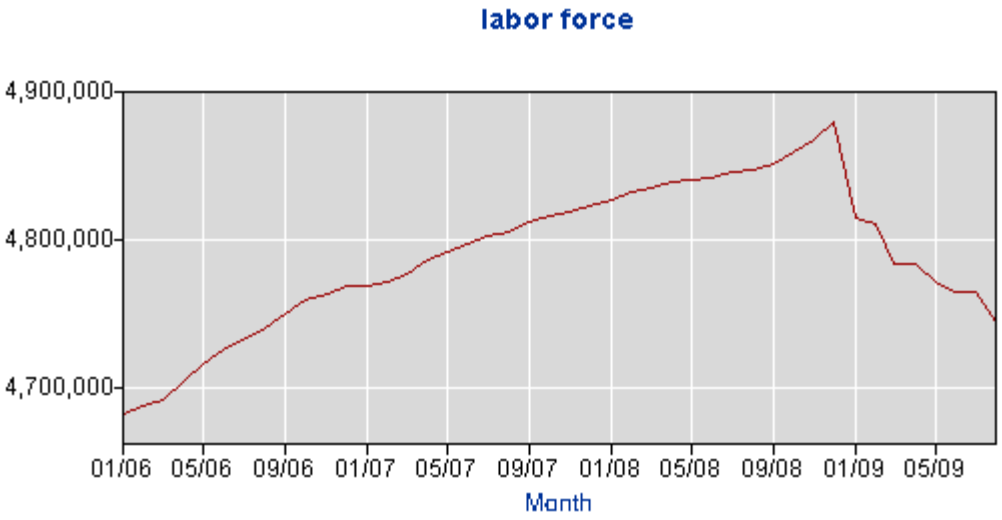
In conclusion, our research enabled us to identify characteristics that were significant in both a good economy and a bad economy as well as significant characteristics that were unique to both. While our

research was limited to identifying what can be observed from objective sales records, we did not explore the "why" behind these observations. For each home sale in Cobb County, there was an individual buyer who made a decision to purchase that house for a certain sales price based on their own decision criteria. An interesting area of research that could compliment our research would be to explore the decision-making process of buyers in a good economy versus a bad economy.

In closing, this study helped to develop a model for determining changes in demand for certain attributes of residential real estate in Cobb County, Georgia, but the application of this research model can be applied in other metropolitan areas as well. The study of changes in hedonic model results over two different periods of time is fairly unexplored and our research could be used as a springboard for other researchers in this area of hedonic modeling. It is my hope that through our initial efforts in this area of study, other researchers will build upon this framework and advance this body of research.

Appendix A

Economic Data



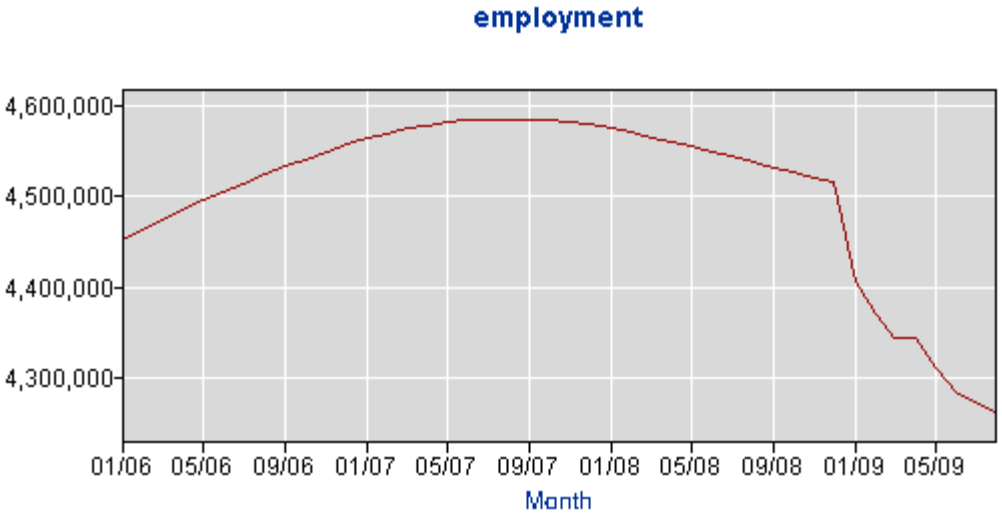
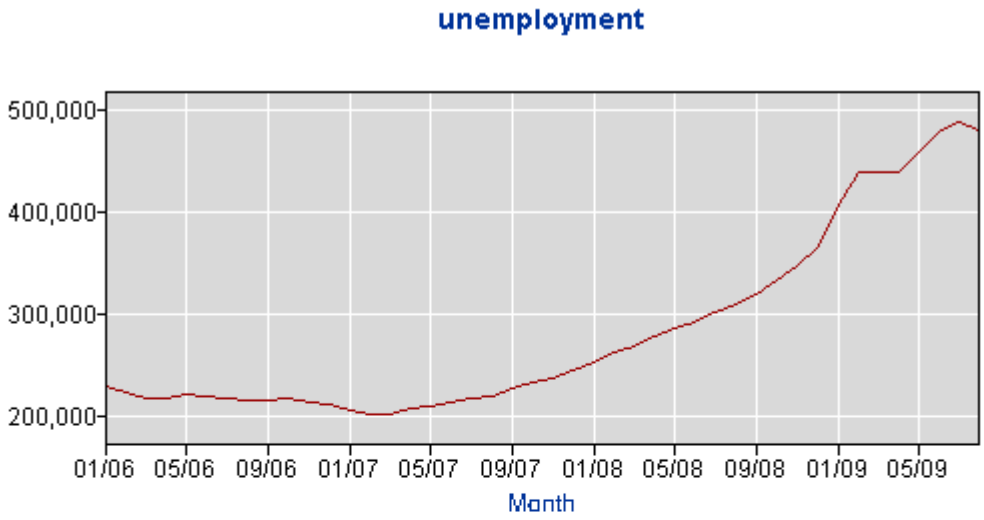


Figure 6.1


unemployment
500,000
400,000
300,000
200,000
01/06
05/06
09/06
01/07
05/07
09/07
01/08
05/08
09/08
01/09
05/09
Month

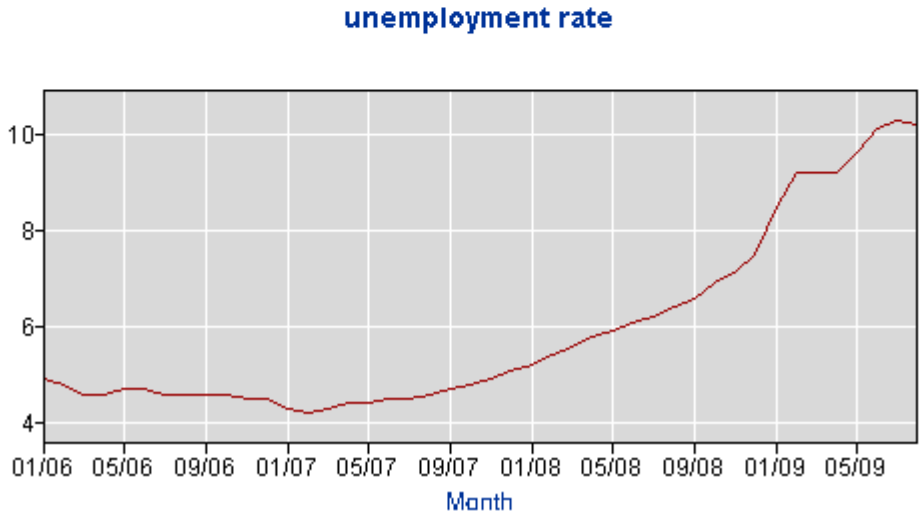

unemployment rate
10
8
6
4
01/06
05/06
09/06
01/07
05/07
09/07
01/08
05/08
09/08
01/09
05/09
Month

Figure 6.2

Table 6.1

[Thousands of persons 16 years of age and over, except as noted; monthly data seasonally adjusted except as noted by NSA]

Period	Civilian noninstitutional population (NSA)	Civilian labor force	Civilian employment				Unemployment				Not in labor force	Percent [1]		
			Total	Men 20 years and over	Women 20 years and over	Both sexes 16–19 years	Total	Men 20 years and over	Women 20 years and over	Both sexes 16–19 years		Labor force participation rate	Employment/population ratio	Unemployment rate
1999 [2]	207,753	139,368	133,488	67,761	58,555	7,172	5,880	2,433	2,285	1,162	68,385	67.1	64.3	4.2
2000 [2]	212,577	142,583	136,891	69,634	60,067	7,189	5,692	2,376	2,235	1,081	69,994	67.1	64.4	4.0
2001	215,092	143,734	136,933	69,776	60,417	6,740	6,801	3,040	2,599	1,162	71,359	66.8	63.7	4.7
2002	217,570	144,863	136,485	69,734	60,420	6,332	8,378	3,896	3,228	1,253	72,707	66.6	62.7	5.8
2003 [2]	221,168	146,510	137,736	70,415	61,402	5,919	8,774	4,209	3,314	1,251	74,658	66.2	62.3	6.0
2004 [2]	223,357	147,401	139,252	71,572	61,773	5,907	8,149	3,791	3,150	1,208	75,956	66.0	62.3	5.5
2005 [2]	226,082	149,320	141,730	73,050	62,702	5,978	7,591	3,392	3,013	1,186	76,762	66.0	62.7	5.1
2006 [2]	228,815	151,428	144,427	74,431	63,834	6,162	7,001	3,131	2,751	1,119	77,387	66.2	63.1	4.6
2007 [2]	231,867	153,124	146,047	75,337	64,799	5,911	7,078	3,259	2,718	1,101	78,743	66.0	63.0	4.6
2008 [2]	233,788	154,287	145,362	74,750	65,039	5,573	8,924	4,297	3,342	1,285	79,501	66.0	62.2	5.8
2008: Aug	234,107	154,823	145,273	74,737	65,003	5,533	9,550	4,572	3,662	1,316	79,284	66.1	62.1	6.2
Sept	234,360	154,621	145,029	74,503	65,008	5,518	9,592	4,889	3,377	1,326	79,739	66.0	61.9	6.2
Oct	234,612	154,878	144,657	74,292	64,975	5,390	10,221	5,088	3,725	1,408	79,734	66.0	61.7	6.6
Nov	234,828	154,620	144,144	74,045	64,902	5,196	10,476	5,290	3,851	1,335	80,208	65.8	61.4	6.8
Dec	235,035	154,447	143,338	73,285	64,860	5,194	11,108	5,714	4,031	1,363	80,588	65.7	61.0	7.2
2009: Jan [2]	234,739	153,716	142,099	72,613	64,298	5,188	11,616	5,972	4,286	1,359	81,023	65.5	60.5	7.6
Feb	234,913	154,214	141,748	72,293	64,271	5,184	12,467	6,394	4,646	1,427	80,699	65.6	60.3	8.1
Mar	235,086	154,048	140,887	71,655	64,148	5,083	13,161	6,923	4,828	1,410	81,038	65.5	59.9	8.5
Apr	235,271	154,731	141,007	71,678	64,226	5,103	13,724	7,403	4,922	1,398	80,541	65.8	59.9	8.9
May	235,452	155,081	140,570	71,593	63,895	5,082	14,511	7,802	5,217	1,491	80,371	65.9	59.7	9.4
June	235,655	154,926	140,196	71,387	63,810	4,999	14,729	7,904	5,249	1,576	80,729	65.7	59.5	9.5
July	235,870	154,504	140,041	71,319	63,789	4,933	14,462	7,726	5,196	1,541	81,366	65.5	59.4	9.4
Aug	236,087	154,577	139,649	71,204	63,662	4,783	14,928	8,027	5,261	1,640	81,509	65.5	59.2	9.7

[1] Civilian labor force (or employment) as percent of civilian noninstitutional population; and unemployment as percent of civilian labor force.

[2] Not strictly comparable with earlier data.

NOTE.—Beginning January 2009 data reflect revised population controls and are not strictly comparable with earlier data.

See *Employment and Earnings* for details on breaks in series.

Source: Department of Labor, Bureau of Labor Statistics.

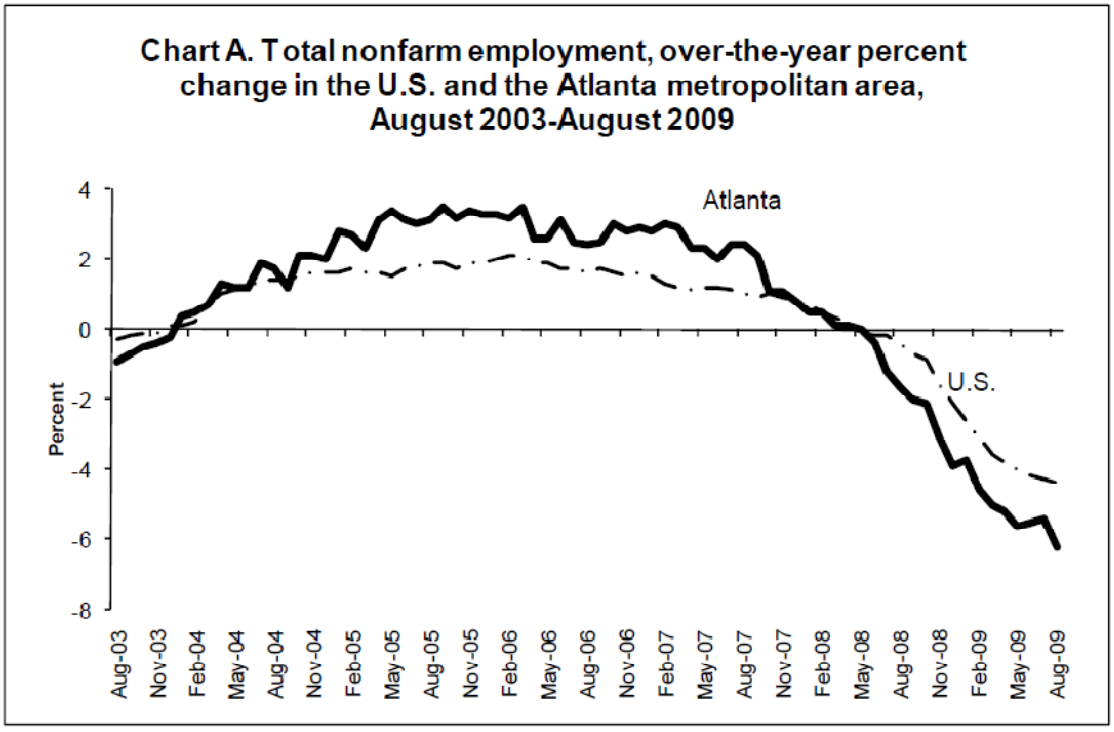


Chart A. Total nonfarm employment, over-the-year percent change in the U.S. and the Atlanta metropolitan area, August 2003-August 2009
Atlanta
U.S.
Percent
4
2
0
-2
-4
-6
-8
Aug-03
Nov-03
Feb-04
May-04
Aug-04
Nov-04
Feb-05
May-05
Aug-05
Nov-05
Feb-06
May-06
Aug-06
Nov-06
Feb-07
May-07
Aug-07
Nov-07
Feb-08
May-08
Aug-08
Nov-08
Feb-09
May-09
Aug-09

Figure 6.3

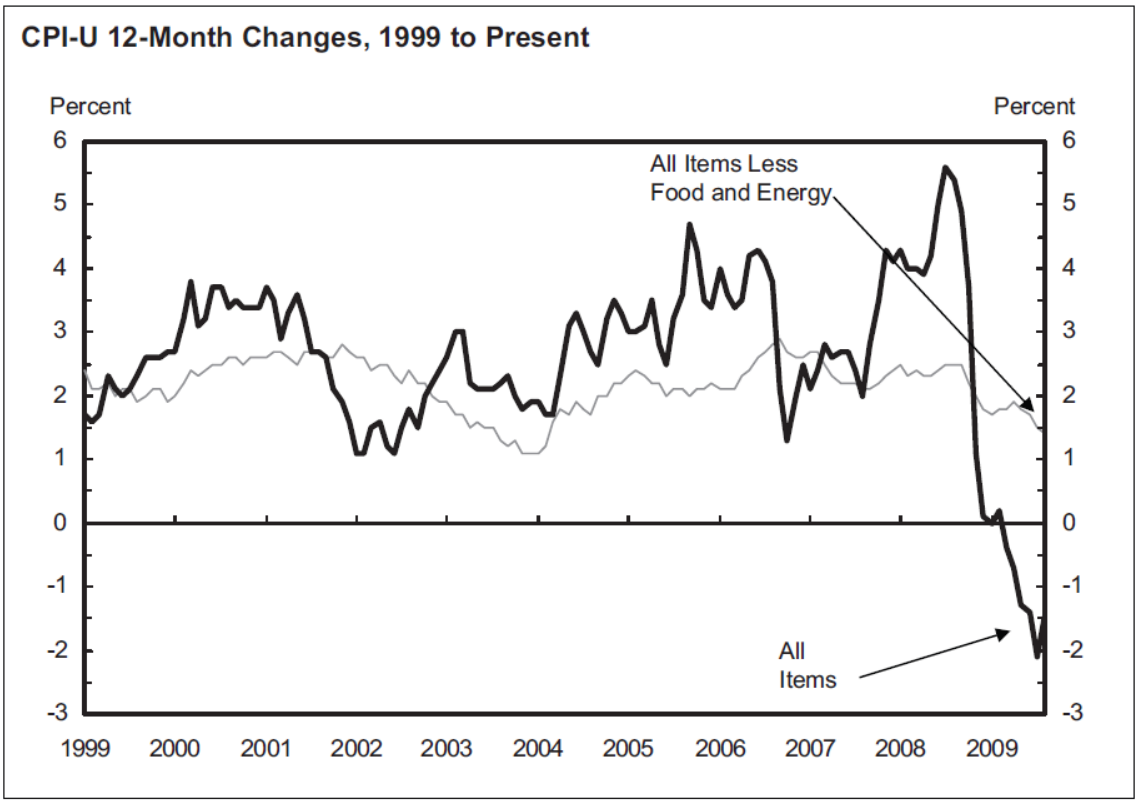

CPI-U 12-Month Changes, 1999 to Present
Percent
Percent
6
5
4
3
2
1
0
-1
-2
-3
All Items Less
Food and Energy
All
Items
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009

Figure 6.4

Table 6.2

Table 27. Historical Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W): U. S. city average, all items-Continued

(1982-84=100, unless otherwise noted)

Year	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
1970	38.0	38.2	38.4	38.7	38.8	39.0	39.2	39.2	39.4	39.6	39.8	40.0
1971	40.0	40.1	40.2	40.4	40.6	40.8	40.9	41.0	41.0	41.1	41.2	41.3
1972	41.4	41.6	41.6	41.7	41.9	42.0	42.1	42.2	42.4	42.5	42.6	42.7
1973	42.9	43.2	43.6	43.9	44.1	44.4	44.5	45.4	45.5	45.9	46.2	46.5
1974	46.9	47.5	48.0	48.3	48.8	49.3	49.7	50.3	50.9	51.4	51.8	52.2
1975	52.4	52.8	53.0	53.2	53.5	53.9	54.5	54.7	54.9	55.3	55.6	55.8
1976	56.0	56.1	56.2	56.5	56.8	57.1	57.4	57.7	57.9	58.2	58.3	58.5
1977	58.9	59.5	59.8	60.3	60.6	61.0	61.3	61.5	61.8	61.9	62.2	62.5
1978	62.8	63.2	63.7	64.3	64.9	65.6	66.0	66.4	66.8	67.4	67.7	68.1
1979	68.7	69.5	70.3	71.1	71.9	72.8	73.7	74.4	75.1	75.7	76.4	77.2
1980	78.3	79.4	80.5	81.4	82.3	83.2	83.3	83.8	84.6	85.3	86.1	86.9
1981	87.5	88.5	89.0	89.6	90.3	91.1	92.2	92.8	93.7	93.9	94.1	94.4
1982	94.7	95.0	94.8	95.2	96.2	97.4	98.0	98.2	98.3	98.6	98.4	98.0
1983	98.1	98.1	98.4	99.0	99.5	99.8	100.1	100.5	101.0	101.2	101.2	101.2
1984	101.6	101.8	101.8	102.1	102.5	102.8	103.2	104.2	104.8	104.8	104.7	104.8
1985	104.9	105.4	105.9	106.3	106.7	107.0	107.1	107.3	107.6	107.9	108.3	108.6
1986	108.9	108.5	107.9	107.6	107.9	108.4	108.4	108.6	109.1	109.1	109.2	109.3
1987	110.0	110.5	111.0	111.6	111.9	112.4	112.7	113.3	113.8	114.1	114.3	114.2
1988	114.5	114.7	115.1	115.7	116.2	116.7	117.2	117.7	118.5	118.9	119.0	119.2
1989	119.7	120.2	120.8	121.8	122.5	122.8	123.2	123.2	123.6	124.2	124.4	124.6
1990	125.9	126.4	127.1	127.3	127.5	128.3	128.7	129.9	131.1	131.9	132.2	132.2
1991	132.8	132.8	133.0	133.3	133.8	134.1	134.3	134.6	135.2	135.4	135.8	135.9
1992	136.0	136.4	137.0	137.3	137.6	138.1	138.4	138.8	139.1	139.6	139.8	139.8
1993	140.3	140.7	141.1	141.6	141.9	142.0	142.1	142.4	142.6	143.3	143.4	143.3
1994	143.6	144.0	144.4	144.7	144.9	145.4	145.8	146.5	146.9	147.0	147.3	147.2
1995	147.8	148.3	148.7	149.3	149.6	149.9	149.9	150.2	150.6	151.0	150.9	150.9
1996	151.7	152.2	152.9	153.6	154.0	154.1	154.3	154.5	155.1	155.5	155.9	155.9
1997	156.3	156.8	157.0	157.2	157.2	157.4	157.5	157.8	158.3	158.5	158.5	158.2
1998	158.4	158.5	158.7	159.1	159.5	159.7	159.8	160.0	160.2	160.6	160.7	160.7
1999	161.0	161.1	161.4	162.7	162.8	162.8	163.3	163.8	164.7	165.0	165.1	165.1
2000	165.6	166.5	167.9	168.0	168.2	169.2	169.4	169.3	170.4	170.6	170.9	170.7
2001	171.7	172.4	172.6	173.5	174.4	174.6	173.8	173.8	174.8	174.0	173.7	172.9
2002	173.2	173.7	174.7	175.8	175.8	175.9	176.1	176.6	177.0	177.3	177.4	177.0
2003	177.7	179.2	180.3	179.8	179.4	179.6	179.6	180.3	181.0	180.7	180.2	179.9
2004	180.9	181.9	182.9	183.5	184.7	185.3	184.9	185.0	185.4	186.5	186.8	186.0
2005	186.3	187.3	188.6	190.2	190.0	190.1	191.0	192.1	195.0	195.2	193.4	192.5
2006	194.0	194.2	195.3	197.2	198.2	198.6	199.2	199.6	198.4	197.0	196.8	197.2
2007	197.559	198.544	200.612	202.130	203.661	203.906	203.700	203.199	203.889	204.338	205.891	205.777
2008	206.744	207.254	209.147	210.698	212.788	215.223	216.304	215.247	214.935	212.182	207.296	204.813
2009	205.700	206.708	207.218	207.925	208.774	210.972	210.526	211.156	-	-	-	-

Table 6.3

Table 25. Historical Consumer Price Index for All Urban Consumers (CPI-U): U.S. city average, by commodity and service group and detailed expenditure categories-Continued

(1982-84=100, unless otherwise noted)

Item and group	Unadjusted indexes								
	December								Aug. 2009
	2001	2002	2003	2004	2005	2006	2007	2008	
Expenditure category									
Repair of household items [2]	122.6	128.6	133.0	142.2	151.9	158.4	165.089	173.193	178.680
Apparel	123.7	121.5	119.0	118.8	117.5	118.6	118.257	117.078	117.130
Men's and boys' apparel	122.8	119.3	118.0	116.3	114.1	113.2	112.026	110.767	110.835
Men's apparel	125.8	124.5	122.4	121.4	119.8	119.4	116.489	114.775	115.491
Men's suits, sport coats, and outerwear	128.1	127.2	128.1	126.0	125.3	120.2	121.449	116.071	112.075
Men's furnishings	132.0	133.2	136.1	134.8	133.4	131.7	126.721	134.123	134.458
Men's shirts and sweaters [2]	92.2	91.3	88.5	86.0	85.4	87.8	81.560	78.307	77.833
Men's pants and shorts	117.5	113.7	106.8	110.3	106.4	106.8	108.284	104.650	110.974
Boys' apparel	110.8	100.6	101.7	97.5	93.8	91.4	95.216	95.395	93.462
Women's and girls' apparel	114.8	113.1	110.9	110.0	108.9	110.2	109.418	105.456	103.991
Women's apparel	115.3	112.9	111.1	109.6	109.7	111.6	110.570	106.734	104.854
Women's outerwear	113.3	113.8	112.6	106.8	102.4	101.7	96.725	95.894	83.423
Women's dresses	99.1	100.3	100.4	96.8	104.2	112.4	115.453	110.886	115.875
Women's suits and separates [2]	90.9	88.7	86.3	86.0	85.6	87.6	87.306	82.653	80.915
Women's underwear, nightwear, sportswear and accessories [2]	97.5	93.8	93.3	92.2	91.8	91.0	88.867	88.612	89.527
Girls' apparel	112.2	114.1	109.5	112.1	104.4	102.8	103.475	98.956	99.408
Footwear	120.6	120.7	118.5	120.3	121.4	123.0	122.258	124.093	125.292
Men's footwear	124.5	124.6	120.4	118.1	120.7	123.4	120.906	125.664	126.848
Boys' and girls' footwear	122.1	120.6	118.2	122.9	124.4	123.4	125.993	131.745	131.365
Women's footwear	116.7	117.3	116.5	119.7	119.7	121.7	120.615	118.767	120.649
Infants' and toddlers' apparel	128.5	125.3	119.2	118.6	115.0	114.1	113.779	112.568	113.673
Jewelry and watches [7]	132.3	127.2	122.1	126.0	123.2	129.1	134.325	143.607	149.270
Watches [7]	117.1	110.9	111.0	112.8	113.7	115.7	113.726	117.491	115.151
Jewelry [7]	136.6	131.7	125.6	129.8	126.4	133.0	139.691	150.122	157.367
Transportation	148.5	154.2	154.7	164.8	172.7	175.4	189.984	164.628	184.386
Private transportation	144.3	150.4	150.8	161.3	168.9	171.8	186.134	159.411	179.987
New and used motor vehicles [2]	101.6	98.7	94.4	95.4	95.8	94.8	94.754	91.408	93.126
New vehicles	143.5	140.6	138.0	138.8	138.3	137.1	136.664	132.308	134.080
New cars and trucks [1 2]	99.6	97.6	95.7	96.3	95.9	95.0	94.727	91.677	92.909
New cars [1]	140.5	137.7	134.8	135.5	136.6	136.9	136.371	134.930	134.666
New trucks [1 8]	152.0	148.6	146.4	147.2	144.4	141.5	141.191	133.657	137.931
Used cars and trucks	157.2	148.5	131.0	137.3	139.2	136.2	136.943	125.883	128.028
Leased cars and trucks [10]	100.0	98.0	95.7	91.7	93.0	92.9	93.464	99.045	102.551
Car and truck rental [2]	103.7	104.2	107.5	103.2	112.1	115.4	113.982	118.241	141.957
Motor fuel	96.1	119.7	127.8	161.2	187.3	199.3	258.132	149.132	225.089
Gasoline (all types)	95.4	119.1	127.2	160.4	186.2	198.1	256.790	146.102	225.179
Gasoline, unleaded regular [1]	93.1	117.1	125.7	159.2	185.8	197.9	256.775	143.918	224.518
Gasoline, unleaded midgrade [1 11]	98.8	123.9	131.4	165.2	190.8	202.1	261.983	152.838	230.939
Gasoline, unleaded premium [1]	97.0	119.8	127.1	158.0	181.1	192.3	247.369	148.343	219.115
Other motor fuels [2]	112.0	113.8	115.8	152.6	186.4	200.1	248.393	185.983	192.872
Motor vehicle parts and equipment	105.8	107.0	107.7	109.9	114.0	119.5	123.928	133.077	133.531
Tires	101.2	101.3	100.8	103.2	106.2	110.0	113.060	119.796	120.108
Vehicle accessories other than tires [2]	106.2	108.7	111.1	112.7	118.4	126.2	132.574	145.311	145.984
Vehicle parts and equipment other than tires [1]	111.3	113.9	115.5	116.0	119.9	125.6	131.420	139.882	141.373
Motor oil, coolant, and fluids [1]	150.7	154.3	160.2	170.3	195.1	224.4	240.510	298.121	289.936
Motor vehicle maintenance and repair	186.4	193.3	198.0	203.3	210.7	218.8	226.120	239.356	243.494
Motor vehicle body work	197.6	201.2	205.0	210.5	220.5	228.1	236.039	245.361	248.751
Motor vehicle maintenance and servicing	171.6	177.9	180.9	186.2	192.2	198.3	204.331	219.020	222.080
Motor vehicle repair [2]	113.5	117.9	121.4	124.4	129.2	134.9	139.602	146.705	149.657
Motor vehicle insurance	279.4	304.6	318.4	329.3	332.5	335.2	336.915	350.308	357.780
Motor vehicle fees [2]	110.4	114.0	121.8	132.3	136.2	139.4	142.248	147.741	155.119
State and local registration and license [2 5]	106.4	110.1	119.4	131.8	134.4	137.6	139.320	142.812	150.528
Parking and other fees [2]	119.6	122.9	126.5	133.0	139.5	142.3	147.630	156.704	163.544
Parking fees and tolls [1 2]	120.2	123.9	128.0	135.4	144.2	146.5	153.178	166.315	174.523
Automobile service clubs [1 2]	109.8	109.5	112.2	113.9	114.1	118.2	119.323	117.295	119.518
Public transportation	204.8	203.0	205.6	205.4	217.6	217.8	233.408	237.638	238.997
Airline fare	229.0	223.4	223.1	219.7	233.8	231.4	255.873	259.566	259.351
Other intercity transportation	152.0	155.1	147.0	144.6	151.6	154.7	156.648	155.454	152.669
Intercity bus fare [1 3]	-	-	-	-	-	-	100.000	108.182	103.224

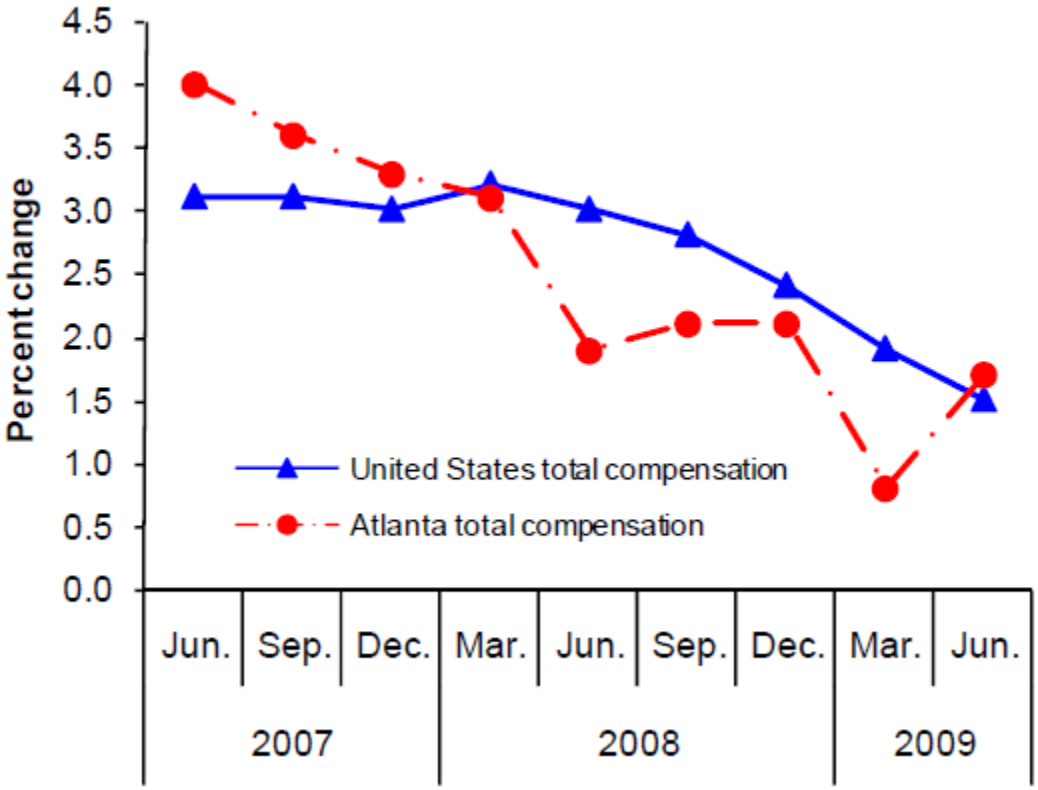

4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Percent change
United States total compensation
Atlanta total compensation
Jun.
Sep.
Dec.
Mar.
Jun.
Sep.
Dec.
Mar.
Jun.
2007
2008
2009

Figure 6.5

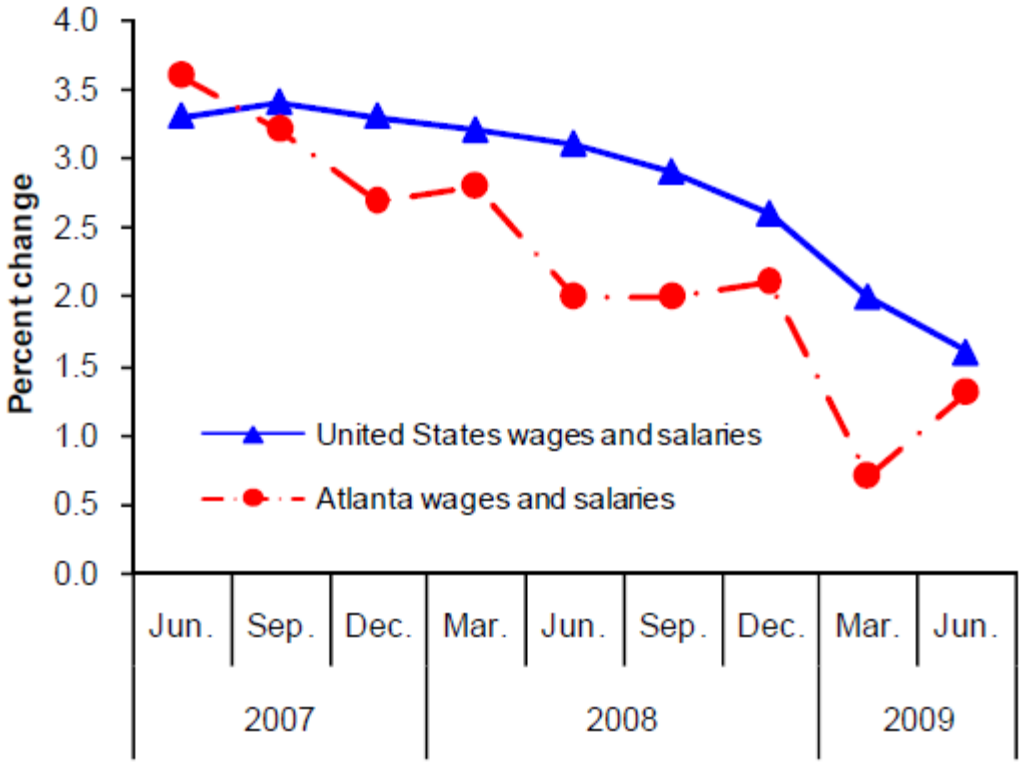

4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
Percent change
United States wages and salaries
Atlanta wages and salaries
Jun.
Sep.
Dec.
Mar.
Jun.
Sep.
Dec.
Mar.
Jun.
2007
2008
2009

Figure 6.6

Table 6.4

PAYROLL EMPLOYMENT											
United States											
	2006	**2007**	**2008**	**07Q3**	**07Q4**	**08Q1**	**08Q2**	**08Q3**	**08Q4**	**09Q1**	**09Q2**
Total (000)	136,086.4	137,598.4	137,065.5	137,637.7	138,917.0	136,380.0	138,061.3	137,057.0	136,763.7	132,172.3	132,554.7
% Chg Year Ago	1.8%	1.1%	-0.4%	1.0%	0.9%	0.5%	0.0%	-0.4%	-1.6%	-3.1%	-4.0%
Government	21,973.8	22,218.2	22,499.7	21,375.3	22,731.3	22,608.7	22,737.0	21,705.3	22,947.7	22,739.7	22,837.0
% Chg Year Ago	0.8%	1.1%	1.3%	0.9%	1.1%	1.3%	1.3%	1.5%	1.0%	0.6%	0.4%
Manufacturing	14,155.3	13,879.1	13,430.8	13,910.7	13,794.3	13,585.3	13,554.0	13,468.0	13,115.7	12,352.7	11,972.3
% Chg Year Ago	-0.5%	-2.0%	-3.2%	-2.2%	-2.0%	-2.2%	-2.6%	-3.2%	-4.9%	-9.1%	-11.7%
Private Nonmfg	99,957.3	101,501.2	101,135.1	102,351.7	102,391.3	100,186.0	101,770.3	101,883.7	100,700.3	97,080.0	97,745.3
% Chg Year Ago	2.3%	1.5%	-0.4%	1.5%	1.2%	0.7%	0.0%	-0.5%	-1.7%	-3.1%	-4.0%
Georgia											
	2006	**2007**	**2008**	**07Q3**	**07Q4**	**08Q1**	**08Q2**	**08Q3**	**08Q4**	**09Q1**	**09Q2**
Total (000)	4,089.1	4,145.5	4,102.5	4,143.4	4,176.6	4,124.4	4,134.6	4,088.2	4,062.6	3,949.4	3,925.9
% Chg Year Ago	2.2%	1.4%	-1.0%	1.4%	0.8%	0.3%	-0.3%	-1.3%	-2.7%	-4.2%	-5.0%
Government	663.1	676.6	693.5	664.3	689.4	695.9	694.8	682.4	700.8	697.8	694.0
% Chg Year Ago	2.1%	2.0%	2.5%	1.8%	1.9%	2.8%	2.9%	2.7%	1.7%	0.3%	-0.1%
Manufacturing	447.5	431.4	408.3	430.4	425.8	420.2	413.6	406.8	392.5	374.2	363.4
% Chg Year Ago	-0.5%	-3.6%	-5.4%	-3.7%	-3.3%	-3.6%	-4.6%	-5.5%	-7.8%	-10.9%	-12.1%
Private Nonmfg	2,978.5	3,037.6	3,000.7	3,048.6	3,061.4	3,008.3	3,026.2	2,999.0	2,969.4	2,877.4	2,868.5
% Chg Year Ago	2.6%	2.0%	-1.2%	2.1%	1.1%	0.3%	-0.5%	-1.6%	-3.0%	-4.4%	-5.2%

Data is Not Seasonally Adjusted
Source: Bureau of Labor Statistics (Haver Analytics)
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Table 6.5

Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.3. Real Gross Domestic Product, Quantity Indexes

[Index numbers, 2005=100] Seasonally adjusted

Today is: 10/13/2009 Last Revised on September 30, 2009 Next Release Date October 29, 2009

Line		2006 I	2006 II	2006 III	2006 IV
1	**Gross domestic product**	**102.196**	**102.564**	**102.592**	**103.341**
2	**Personal consumption expenditures**	**101.901**	**102.450**	**103.081**	**104.112**
3	Goods	102.335	102.501	103.334	104.835
4	Durable goods	103.327	103.064	104.216	105.647
5	Nondurable goods	101.793	102.191	102.851	104.383
6	Services	101.670	102.421	102.945	103.731
7	**Gross private domestic investment**	**104.258**	**104.098**	**102.643**	**99.712**
8	Fixed investment	103.670	103.186	101.880	100.499
9	Nonresidential	105.759	107.643	108.811	109.440
10	Structures	103.696	109.068	111.771	112.185
11	Equipment and software	106.542	107.101	107.681	108.414
12	Residential	100.031	95.502	89.988	85.194
13	Change in private inventories	---	---	---	---
14	**Net exports of goods and services**	---	---	---	---
15	Exports	106.415	108.200	108.353	112.882
16	Goods	107.085	109.021	109.069	112.488
17	Services	104.897	106.339	106.729	113.773
18	Imports	104.613	105.774	107.040	106.917
19	Goods	104.376	105.665	107.100	106.476
20	Services	105.888	106.358	106.715	109.276
21	**Government consumption expenditures and gross investment**	**101.147**	**101.232**	**101.386**	**101.670**
22	Federal	102.763	101.887	101.792	102.066
23	National defense	101.115	101.384	100.892	102.963
24	Nondefense	106.163	102.927	103.653	100.203
25	State and local	100.205	100.851	101.149	101.437

Table 6.6

Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.3. Real Gross Domestic Product, Quantity Indexes

[Index numbers, 2005=100] Seasonally adjusted

Today is: 10/13/2009 Last Revised on September 30, 2009 Next Release Date October 29, 2009

Line		2007 I	2007 II	2007 III	2007 IV
1	**Gross domestic product**	**103.652**	**104.475**	**105.402**	**105.957**
2	**Personal consumption expenditures**	**105.059**	**105.358**	**105.858**	**106.175**
3	Goods	105.854	105.904	106.724	107.513
4	Durable goods	107.074	107.634	109.001	110.464
5	Nondurable goods	105.177	104.961	105.507	105.973
6	Services	104.641	105.068	105.403	105.477
7	**Gross private domestic investment**	**98.176**	**99.539**	**99.736**	**97.753**
8	Fixed investment	99.838	100.726	100.626	99.564
9	Nonresidential	110.561	113.579	116.219	118.109
10	Structures	116.327	122.437	129.869	133.348
11	Equipment and software	108.285	110.007	110.615	111.829
12	Residential	81.521	78.764	73.932	67.745
13	Change in private inventories	---	---	---	---
14	**Net exports of goods and services**	---	---	---	---
15	Exports	113.856	115.302	120.293	124.436
16	Goods	113.311	115.048	119.075	122.613
17	Services	115.087	115.871	123.050	128.568
18	Imports	108.041	107.907	108.904	107.901
19	Goods	107.792	107.527	108.277	107.239
20	Services	109.381	109.950	112.250	111.435
21	**Government consumption expenditures and gross investment**	**101.671**	**102.764**	**103.757**	**104.169**
22	Federal	100.738	102.558	104.871	105.570
23	National defense	100.952	103.059	105.546	105.668
24	Nondefense	100.282	101.505	103.457	105.367
25	State and local	102.203	102.875	103.110	103.356

Table 6.7

Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.3. Real Gross Domestic Product, Quantity Indexes

[Index numbers, 2005=100] Seasonally adjusted

Today is: 10/13/2009 Last Revised on September 30, 2009 Next Release Date October 29, 2009

Line		2008 I	2008 II	2008 III	2008 IV
1	**Gross domestic product**	**105.764**	**106.147**	**105.430**	**103.984**
2	**Personal consumption expenditures**	**106.016**	**106.032**	**105.088**	**104.267**
3	Goods	106.121	105.983	103.895	101.186
4	Durable goods	107.931	106.354	103.083	97.401
5	Nondurable goods	105.165	105.738	104.219	102.929
6	Services	105.953	106.047	105.697	105.837
7	**Gross private domestic investment**	**95.887**	**93.292**	**91.643**	**85.519**
8	Fixed investment	97.969	97.291	95.199	89.964
9	Nonresidential	118.674	119.083	117.210	111.040
10	Structures	135.559	140.215	140.191	137.603
11	Equipment and software	111.685	110.258	107.577	99.808
12	Residential	62.355	59.738	57.208	53.549
13	Change in private inventories	---	---	---	---
14	**Net exports of goods and services**	---	---	---	---
15	Exports	124.395	127.997	126.828	120.149
16	Goods	123.873	128.016	127.446	118.407
17	Services	125.587	127.965	125.429	124.054
18	Imports	107.225	105.853	105.259	100.547
19	Goods	106.290	105.035	104.045	98.517
20	Services	112.249	110.211	111.849	111.605
21	**Government consumption expenditures and gross investment**	**104.845**	**105.782**	**107.036**	**107.346**
22	Federal	107.654	109.698	113.152	114.946
23	National defense	107.760	109.597	114.668	115.732
24	Nondefense	107.442	109.925	109.956	113.288
25	State and local	103.234	103.549	103.576	103.061

Table 6.8

Bureau of Economic Analysis
National Income and Product Accounts Table

Table 1.1.3. Real Gross Domestic Product, Quantity Indexes

[Index numbers, 2005=100] Seasonally adjusted

Today is: 10/13/2009 Last Revised on September 30, 2009 Next Release Date October 29, 2009

Line		2009 I	2009 II
1	**Gross domestic product**	**102.271**	**102.082**
2	**Personal consumption expenditures**	**104.425**	**104.196**
3	Goods	101.817	101.023
4	Durable goods	98.345	96.947
5	Nondurable goods	103.405	102.911
6	Services	105.761	105.809
7	**Gross private domestic investment**	**71.746**	**67.059**
8	Fixed investment	79.514	76.895
9	Nonresidential	98.061	95.623
10	Structures	119.243	113.716
11	Equipment and software	89.143	88.036
12	Residential	47.478	44.436
13	Change in private inventories	---	---
14	**Net exports of goods and services**	---	---
15	Exports	109.922	108.766
16	Goods	105.520	103.817
17	Services	119.619	119.649
18	Imports	89.804	86.292
19	Goods	86.326	82.520
20	Services	108.238	106.160
21	**Government consumption expenditures and gross investment**	**106.639**	**108.386**
22	Federal	113.693	116.801
23	National defense	114.219	118.014
24	Nondefense	112.576	114.259
25	State and local	102.660	103.640

Table 6.9

NEW CONSTRUCTION

[Billions of dollars; monthly data at seasonally adjusted annual rates]

Period	Total new construction expenditures	Private									Federal and State and local
		Total	Residential		Nonresidential						
			Total[1]	New housing	Total	Lodging	Office	Commercial (including farm)	Manufacturing	Other[2]	
1999	744.6	575.5	326.3	251.3	249.2	16.0	45.1	59.4	35.1	93.7	169.1
2000	802.8	621.4	346.1	265.0	275.3	16.3	52.4	64.1	37.6	104.9	181.3
2001	840.2	638.3	364.4	279.4	273.9	14.5	49.7	63.6	37.8	108.2	201.9
2002	847.9	634.4	396.7	298.8	237.7	10.5	35.3	59.0	22.7	110.2	213.4
2003	891.5	675.4	446.0	345.7	229.3	9.9	30.6	57.5	21.4	109.9	216.1
2004	991.6	771.4	532.9	417.5	238.5	12.0	32.9	63.2	23.7	106.8	220.2
2005	1,102.7	868.5	611.9	480.8	256.6	12.7	37.3	66.6	29.9	110.2	234.2
2006	1,167.6	912.2	613.7	468.8	298.4	17.6	45.7	73.4	35.1	126.7	255.4
2007	1,150.7	861.6	493.2	354.1	368.4	27.5	53.8	85.9	45.3	155.9	289.1
2008	1,072.1	766.2	350.1	229.9	416.1	35.4	57.1	81.5	60.8	181.4	306.0
2008: July	1,070.2	759.8	339.9	231.1	419.9	37.0	57.9	82.8	57.3	185.0	310.4
Aug	1,066.1	756.4	340.2	220.7	416.2	37.4	58.0	79.9	61.1	179.8	309.7
Sept	1,081.2	773.6	350.4	212.9	423.2	36.8	58.4	77.9	65.8	184.3	307.6
Oct	1,064.1	754.1	327.7	204.7	426.3	36.6	56.5	76.5	71.0	185.8	310.0
Nov	1,037.3	726.8	310.5	192.1	416.4	35.7	55.8	73.5	70.6	180.7	310.5
Dec	1,002.1	696.6	292.3	176.2	404.3	31.8	51.6	71.0	70.2	179.7	305.6
2009: Jan	974.3	673.8	278.8	162.6	395.1	29.2	49.0	66.7	77.3	172.9	300.4
Feb	970.4	660.9	260.8	147.9	400.1	29.1	48.4	66.5	81.3	174.7	309.5
Mar	966.7	650.4	248.9	139.2	401.5	31.2	48.1	65.0	82.0	175.3	316.3
Apr	971.4	654.1	252.7	130.7	401.5	30.2	43.7	62.1	84.1	181.3	317.2
May[r]	958.3	639.8	241.4	123.4	398.4	28.4	44.1	58.8	85.4	181.8	318.5
June[r]	959.5	629.6	240.1	124.5	389.5	26.2	43.6	55.0	83.2	181.5	329.9
July[p]	958.0	630.4	245.6	130.1	384.9	24.0	42.8	54.1	84.0	180.0	327.6

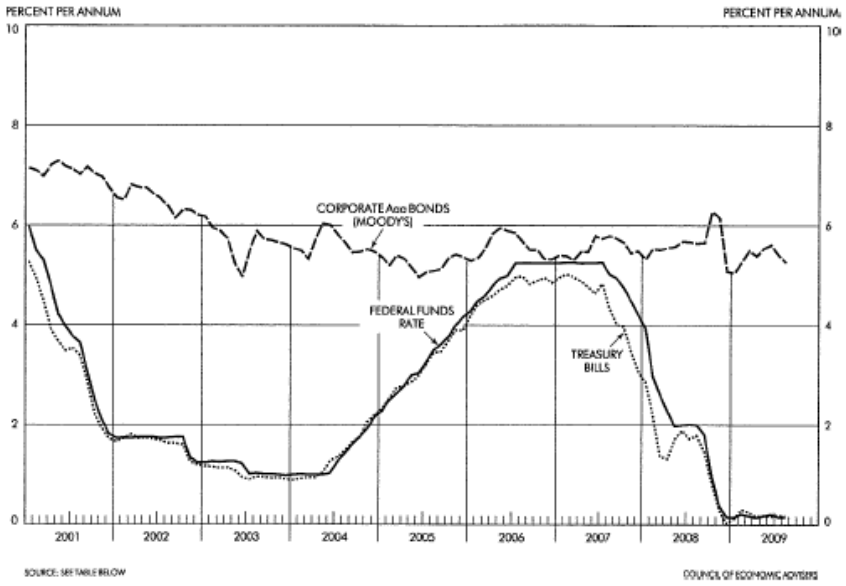
[1] Includes residential improvements, not shown separately.
[2] Includes health care, educational, communication, and power, among other categories not shown separately.

Source: Department of Commerce, Bureau of the Census.

Table 6.10

INTEREST RATES AND BOND YIELDS

Interest rates were mixed in August.



[Percent per annum]

Period	U.S. Treasury security yields				High-grade municipal bonds (Standard & Poor's)[3]	Corporate Aaa bonds (Moody's)	Discount window (N.Y. F.R. Bank)[4,5]		Prime rate charged by banks[5]	Federal funds rate[6]	New-home mortgage yields (FHFB)[7]
	3-month bills (at auction)[1]	Constant maturities[2]					Primary credit	Discount rate			
		3-year	10-year	30-year							
1999	4.66	5.49	5.65	5.87	5.43	7.04	.....	4.62	8.00	4.97	7.04
2000	5.85	6.22	6.03	5.94	5.77	7.62	.....	5.73	9.23	6.24	7.52
2001	3.44	4.09	5.02	5.49	5.19	7.08	.....	3.40	6.91	3.88	7.00
2002	1.62	3.10	4.61	*	5.05	6.49	.....	1.17	4.67	1.67	6.43
2003	1.01	2.10	4.01	*	4.73	5.67	2.12	*	4.12	1.13	5.80
2004	1.38	2.78	4.27	*	4.63	5.63	2.34	*	4.34	1.35	5.77
2005	3.16	3.93	4.29	*	4.29	5.24	4.19	*	6.19	3.22	5.94
2006	4.73	4.77	4.80	4.91	4.42	5.59	5.96	*	7.96	4.97	6.63
2007	4.41	4.35	4.63	4.84	4.42	5.56	5.86	*	8.05	5.02	6.41
2008	1.48	2.24	3.66	4.28	4.80	5.64	2.39	*	5.09	1.92	6.05
2008: Aug	1.79	2.70	3.89	4.50	4.90	5.64	2.25	*	5.00	2.00	6.33
Sept	1.46	2.32	3.69	4.27	5.03	5.65	2.25	*	5.00	1.81	6.09
Oct	.84	1.86	3.81	4.17	5.68	6.28	1.25	*	4.00	.97	6.10
Nov	.30	1.51	3.53	4.00	5.28	6.15	1.25	*	4.00	.39	6.16
Dec	.04	1.07	2.42	2.87	5.53	5.08	.50	*	3.25	.16	5.67
2009: Jan	.12	1.13	2.52	3.13	5.13	5.05	.50	*	3.25	.15	5.11
Feb	.31	1.37	2.87	3.59	5.00	5.27	.50	*	3.25	.22	5.09
Mar	.25	1.31	2.82	3.64	5.15	5.50	.50	*	3.25	.18	5.10
Apr	.17	1.32	2.93	3.76	4.88	5.39	.50	*	3.25	.15	4.96
May	.15	1.39	3.29	4.23	4.60	5.54	.50	*	3.25	.18	4.92
June	.17	1.76	3.72	4.52	4.84	5.61	.50	*	3.25	.21	5.17
July	.19	1.55	3.56	4.41	4.69	5.41	.50	*	3.25	.16	5.40
Aug	.18	1.65	3.59	4.37	4.58	5.26	.50	*	3.25	.16	.....
Week ended:											
2009: Aug 8	.18	1.78	3.77	4.52	4.65	5.34	.50	*	3.25	.18	.....
15	.19	1.72	3.67	4.47	4.63	5.34	.50	*	3.25	.17	.....
22	.18	1.56	3.48	4.31	4.54	5.24	.50	*	3.25	.16	.....
29	.16	1.57	3.46	4.23	4.51	5.14	.50	*	3.25	.16	.....
2009: Sept 5	.15	1.44	3.37	4.18	4.32	5.10	.50	*	3.25	.15	.....

[1] High bill rate at auction, issue date within period, bank-discount basis. Data are stop yields from uniform-price auctions.

[2] Yields on actively traded issues adjusted to constant maturities.

[3] Weekly data are Wednesday figures.

[4] Discount window borrowing for primary credit and discount rate (adjustment credit). The rate for primary credit replaced the rate for adjustment credit.

[5] Average effective rate for year; rate in effect at end of month or week.

[6] Daily effective rate; weighted average of rates on brokered trades.

[7] Effective rate (in the primary market) on conventional mortgages, reflecting fees and charges as well as contract rate and assumed, on the average, repayment at end of 10 years.

* Discount rate (adjustment credit) series was discontinued after January 8, 2003. Series for 30-year constant maturity was discontinued on February 18, 2002, and reintroduced on February 9, 2006.

Sources: Department of the Treasury, Board of Governors of the Federal Reserve System, Federal Housing Finance Board, Moody's Investors Service, and Standard & Poor's.

COMMON STOCK PRICES AND YIELDS

Stock stock prices rose in August.

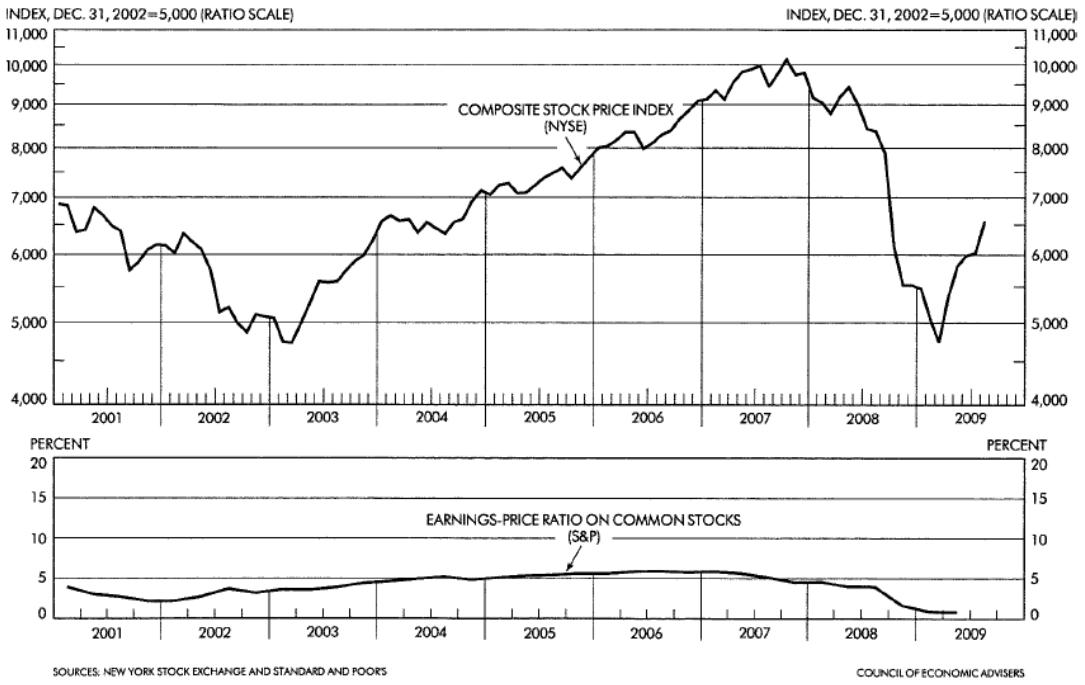


Figure 6.7

Table 6.11

Period	Common stock prices [1]							Common stock yields (percent) [7]	
	New York Stock Exchange indexes [2 3] (December 31, 2002=5,000)				Dow Jones industrial average [4]	Standard & Poor's composite index (1941–43=10) [5]	Nasdaq composite index (Feb. 5, 1971=100) [6]	Dividend-price ratio	Earnings-price ratio
	Composite	Financial	Energy	Health Care					
1999	6,546.81	.....	.....	.....	10,464.88	1,327.33	2,728.15	1.25	3.17
2000	6,805.89	.....	.....	.....	10,734.90	1,427.22	3,783.67	1.15	3.63
2001	6,397.85	.....	.....	.....	10,189.13	1,194.18	2,035.00	1.32	2.95
2002	5,578.89	.....	.....	.....	9,226.43	993.94	1,539.73	1.61	2.92
2003	5,447.46	5,583.00	5,273.90	5,288.67	8,993.59	965.23	1,647.17	1.77	3.84
2004	6,612.62	6,822.18	6,952.36	5,924.80	10,317.39	1,130.65	1,986.53	1.72	4.89
2005	7,349.00	7,383.70	9,377.84	6,283.96	10,547.67	1,207.23	2,099.32	1.83	5.36
2006	8,357.99	8,654.40	11,206.94	6,685.06	11,408.67	1,310.46	2,263.41	1.87	5.78
2007	9,648.82	9,321.39	13,339.99	7,191.79	13,169.98	1,477.19	2,578.47	1.86	5.29
2008	8,036.88	6,278.38	13,258.42	6,171.19	11,252.62	1,220.04	2,161.65	2.37	3.54
2008: Aug	8,362.20	6,304.58	13,772.04	6,618.92	11,530.75	1,281.47	2,389.27	2.23	.....
Sept	7,886.29	6,159.18	12,562.82	6,316.05	11,114.08	1,217.01	2,205.20	2.36	3.94
Oct	6,130.39	4,733.74	9,515.71	5,434.03	9,176.71	968.80	1,730.32	2.83	.....
Nov	5,527.63	3,779.86	9,262.07	5,088.99	8,614.55	883.04	1,542.70	3.11	.....
Dec	5,525.70	3,673.95	9,136.33	5,090.83	8,595.56	877.56	1,525.89	3.00	1.65
2009: Jan	5,477.14	3,337.14	9,295.97	5,256.13	8,396.20	865.58	1,537.20	3.01	.....
Feb	5,051.42	2,823.74	8,785.04	5,106.78	7,690.50	805.23	1,485.98	3.07	.....
Mar	4,739.72	2,633.65	8,266.81	4,596.81	7,235.47	757.13	1,432.23	2.92	.86
Apr	5,338.39	3,313.47	8,839.95	4,771.71	7,992.12	848.15	1,641.15	2.60	.....
May	5,823.10	3,819.95	9,848.66	5,051.78	8,398.37	902.41	1,726.08	2.41	.....
June	5,985.64	3,924.19	10,189.64	5,224.16	8,593.00	926.12	1,826.99	2.35	.83
July	6,026.55	4,000.66	9,765.09	5,410.22	8,679.75	935.82	1,873.84	2.31	.....
Aug	6,577.18	4,646.60	10,295.91	5,706.96	9,375.06	1,009.72	1,997.16	2.12	.....
Week ended:									
2009: Aug 8	6,559.47	4,595.21	10,355.10	5,637.88	9,302.81	1,003.71	1,997.28	2.13	.....
15	6,538.89	4,610.51	10,190.53	5,649.47	9,332.12	1,004.82	1,991.11	2.13	.....
22	6,499.62	4,575.69	10,136.76	5,704.55	9,297.69	999.87	1,973.22	2.15	.....
29	6,697.53	4,777.04	10,503.14	5,819.84	9,543.38	1,028.32	2,024.63	2.08	.....
Sept 5	6,557.91	4,647.52	10,205.09	5,733.11	9,374.69	1,006.61	1,989.40	2.16	.....

[1] Average of daily closing prices.
[2] Includes all the stocks (nearly 1,850) listed on the NYSE.
[3] Effective January 9, 2003, the NYSE relaunched the composite index with changes in methodology, definitions, and based on Dec. 31, 2002=5,000. Effective January 8, 2004 new indexes for Financial, Energy, and Health Care were introduced by the NYSE. Previous indexes shown for Industrial, Transportation, Utility, and Finance were discontinued.
[4] Includes 30 stocks.
[5] Includes 500 stocks.
[6] Includes about 3,000 stocks.
[7] Standard & Poor's series. Dividend-price ratios based on Wednesday closing prices. Earnings-price ratios based on prices at end of quarter.

Sources: New York Stock Exchange, Dow Jones & Company, Inc., Standard & Poor's, and Nasdaq Stock Market.

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